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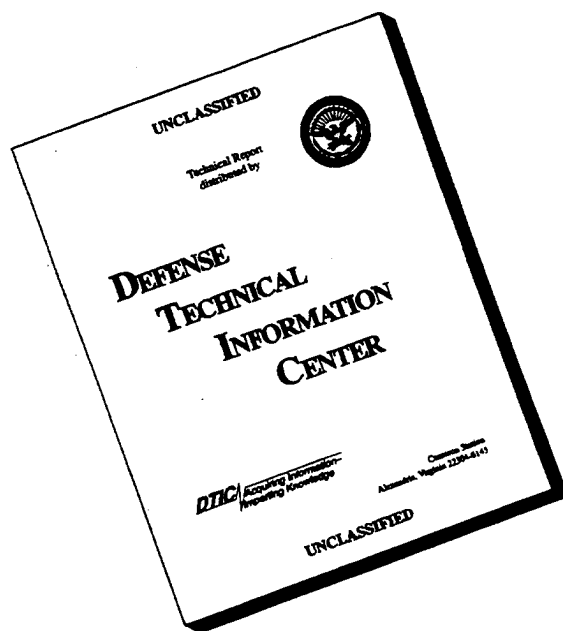
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DEFENSE WOMEN'S HEALTH RESEARCH PROGRAM

12 October 1995

Final Report

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INTRODUCTION

RELEVANCE TO SERVICEWOMEN / MILITARY

The systematic study of women's health issues in the military is timely for women in all branches of service. Numbering approximately 10% of active duty service members, women are increasingly assuming critical positions of responsibility which fully expose them to the hazards of combat. Following the collapse of the Berlin Wall, the resulting global instability has required the military to prepare its forces, including women, to engage in planning for a number of mission contingencies. These potential missions include peacekeeping (ex: Sinai MFO treaty), peacemaking (Somalia), humanitarian aid (post-ODS civilian refugee care), disaster response to natural and manmade disasters (Hurricane Andrew & Los Angeles riots), and, of course, combat, in the air, on land and at sea.

At present, military women are exposed to both direct combat experience as well as indirect combat exposure secondary to support roles. Military leaders have long recognized that mission readiness requires both the absence of disease and the presence of mental, physical, and spiritual health. However, little is presently known about how the health of military women may be uniquely affected by extreme environments. Such knowledge is essential to meeting the health needs of military women to sustain fitness for all mission contingencies.

Servicewomen are naturally concerned with maintaining their health as an integral part of their readiness to assume any mission they are trained to perform. Research aimed at identifying and understanding overall and gender-specific stressors involved with combat stress, trauma, and extreme environments will enhance the ability of individual servicewomen to care for themselves within an institution that is informed of and concerned with their needs. Educational and preventive measures resulting in servicewomen assuming informed responsibility for their health needs within the context of a supportive group system parallels the process of fostering individual initiative and group cohesion that is essential to mission performance on aircraft, ships, and battlefields.

Present research on stress and gender indicate that women are more likely than men to be depressed, describe phobias, and panic attacks (Baum & Grunberg, 1991). It has often been assumed that women experience less stress at work than men although data are scant on this issue. Women are more likely to visit physicians and seek health care so that many of the differences in base rates of illness may be a result of this factor. Gender may mediate the effects of stress on health in several ways. Firstly directly through biological differences. Secondly through affecting perception, interpretation and attribution. Some data indicate that women are more willing to report distress than men although illness and physiologic responses may be parallel to males. Thirdly, women generally report greater social supports than men. Social supports (e.g. unit cohesion) are well known to affect health, either directly or through coping. Smoking and alcohol use are examples of coping strategies that have traditionally been used more frequently by men. As increasing numbers of women adopt similar maladaptive coping strategies, the effects of stress on health may also change in women.

Exposure to traumatic events and the grotesque can serve as an analog to aid in understanding the potential effects of combat stress on women. These data indicate greater risk for posttraumatic stress in single parents with children and higher rates of somatization among women in general. The higher base rates of psychiatric illness in women, their greater social supports (although the relationship to unit cohesion in women is less clear), higher distress after exposure to death and the grotesque may be expected to alter responses to trauma compared to that in men. In addition, differences in fatigue, chronic stress tolerance, effects of sleep deprivation and variation of stress effects across the menstrual cycle can increase or decrease stress tolerance and health effects.

Overall, empirical studies in this area are grossly lacking. The systematization of the available information, further hypothesis generating empirical study, and consideration of operational implications are needed.

This multi-study programmatic project was directed to understanding the effects of the stress of combat, trauma and extreme environments on women's health and performance. It identified critical health and performance issues related to women in the extreme environments of combat, peace-keeping, peace-making, humanitarian operations, and deployment. The project proceeded in three stages and addressed tri-service overlapping areas of the effects of these stressors in operational environments.

Stage I: The development of a computer accessible database.

Stage II: The analysis of already existing datasets.

Stage III: A consensus meeting of experts and a series of seminars and written reviews of selected topics in order to address the data accumulated and formulate recommendations.

BODY

The project consists of three stages. Products will be delivered no later than April 1996.

Stage I: Computerized Database on Women's Health and the Stress of Combat, Trauma and Extreme Environments. A computerized database on the effects of extreme environments, combat, stress and trauma on women's physical and mental health has been developed. This database broadly examines the biopsychosocial stressors and responses in women through collecting all English language non-classified epidemiological and stress research in these areas and by examining analogous areas in which relevant conclusions can be drawn (studies of disaster events, confined environments, Antarctica, space, etc.). In addition, this database includes references and abstracts of articles on stress and women's health, traumatic stress, occupational risk factors, deployment, disaster medicine, humanitarian aid, ethical considerations, and sexual harassment. This database will be delivered on disk, and has been designed to be accessible by personal computer using software that is readily available (PROCITE) and the standard of the field. At this juncture, approximately 3300 articles have been collected and have been through a preliminary input stage. The database is currently undergoing a quality assurance process before the final product is delivered.

Stage II: Empirically examine trauma and women's health in existing datasets collected by our research group. We are analyzing several of our existing datasets of military women exposed to traumatic events, e.g., Operation Desert Storm, Hurricane Andrew, three airplane disasters, and epidemiologic data of women in the military. We are examining our existing data from the spouses of active duty men involved in these traumas. Our data sets include extensive assessments of physical and mental health, posttraumatic distress and psychosocial functioning. Analyses describe each group of women and compare them with a matched (age, education, rank and marital status) group of men with similar exposure. Since the individual data sets of women are small, analyses are first describing the results by group and, where possible, combining groups across trauma exposures for certain analyses. Particular attention is being given to rates of possible PTSD, levels of somatization, depression, hostility, fatigue and health care utilization.

1. Women deployed on the USS Comfort during Operation Desert Storm (N = 200, 35% women). Data during deployment and follow-up data are being examined.
2. Homestead Air Force Base personnel after Hurricane Andrew (N = 243, 10% active duty women; spouses of active duty men, N=145) and matched control groups from MacDill and Shaw AFB (N=150, 10% active duty women; and spouses of active duty men, N = 90).
3. Sioux City, Iowa, United Airlines plane crash. We are examining our data on the disaster workers (185th Air National Guard Fighter Group) and their spouses. We have data from a matched control group at the Air National Guard Unit in Sioux Falls, South Dakota. The groups were matched by mission and sociodemographics of the communities. The total sample size was : N = 308 (Sioux City) and 421 (Sioux Falls). Approximately 10-15% of each of these groups are women. In addition, a sample of women indirectly exposed to the trauma of the crash (spouses of the ANG groups) is available (N= 196 for Sioux City; N= 255 for Sioux Falls). Thus we will be able to examine both high direct exposure to the air crash and indirect trauma exposure in the spouses using matched control groups.
4. The 1988 Italian Air Show crash at Ramstein AFB. We have data from people involved at the Ramstein Medical Clinic (N = 126). We also have data from personnel at nearby Landstuhl Medical Center who treated victims of the disaster (N = 234). Approximately 35% of each of these groups are active duty service women.
5. We have data from the 128th Air National Guard Unit at Milwaukee following the Milwaukee National Guard plane explosion in 1993 and a matched ANG unit in Topeka, Kansas. This dataset is being collected at present.
6. We are examining a large dataset of active duty army troops from Fort Ord and Fort Carson (N = 2367 with 435 women) addressing garrison stressors and mental and physical health. We used standardized measures used in many epidemiologic studies, e.g., the General Health Questionnaire (GHQ), Physical Health Practices (PHP), the Combat Stress Scale, as well as measures of unit cohesion and confidence, social supports and family life.

Stage III. A conference was held on June 16-18 1995 at Aerlie House, Virginia which convened distinguished military, academic, and civilian experts to review identified areas of stress effects on women's health from the database and empirical data analyses. National and international military experts participated (see Appendix A for list of attendees). The program schedule (Appendix B) and a volume of readings (Appendix C) which was sent to participants prior to the conference are included for your information. The conference was transcribed and is being edited into a volume which will be submitted no later than April 1996. The volume will include recommendations addressing the accumulated knowledge of extreme stress on women's health and performance and resulting operational needs of command; training; medical care; and programmatic objectives for further research.

In addition to the conference, a series of seminars were held to collect more information on stress and women's health. Transcriptions of these seminars are also being edited into a series of volumes which will be submitted no later than April 1996. A list of the consultants and titles of presentations is included for your information. (Appendix D).

CONCLUSIONS

Our initial analysis has underscored the importance of examining the responses of military women exposed to trauma. Our initial empirical findings of active duty women from Homestead AFB who relocated during Hurricane Andrew suggest that these women had high levels of acute posttraumatic stress. Approximately 30% of the active duty women experienced clinical levels of acute stress during the week of the disaster. High levels of intrusive symptoms were found in these women (IES intrusion mean=21.677, $sd=8.677$). Interestingly, compared to the active duty women, the Homestead active duty men showed significantly lower intrusive symptoms (mean=17.239, $sd=9.735$; $t=-2.4283$, $df=297.0$, $p=.0158$). In addition, the women had high levels of avoidant symptoms 1 week post-disaster (mean=16.17, $sd=9.655$). Again, active duty men had lower levels of avoidant symptoms (mean=13.251, $sd=8.633$) that approached significance as compared to the women ($t=-1.7604$, $df=297$, $p=.0794$). Initial findings of depression in active duty women at Homestead AFB 1 week post Hurricane Andrew show high levels of depression (SCL-90-R mean=1.015, $sd=.98015$.) As compared to the active duty women, depression in Homestead men was significantly lower (mean=.6973, $sd=.816076$; $t=-2.0657$, $df=304$, $p=.0397$). The Global Symptom Index (GSI) for the Homestead women was mean=40.1765 ($sd=32.978$). Based on our preliminary empirical data, further examination of acute posttraumatic disorders and other psychiatric disorders is indicated.

The computerized database has already proven to be of great benefit to us as we review the literature on women and trauma. Consideration should be given to extending the database to incorporate publications arising from the first round of DWHRP grants and other literature which appears in periodicals and books during the upcoming grant cycle.

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Trauma, Stress & Health:

Military Women in Combat Deployment & Contingency Operations



16-18 June 1995

*The Airline House
Airline, VA*

A Conference Sponsored by:

*The Department of Psychiatry
Uniformed Services University
of the Health Sciences
Bethesda, MD*



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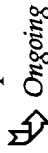
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Friday 16 June

Afternoon

3:00 pm Registration



Ongoing Airline Main Building

5:30 pm Reception / Dinner

Airline Open-Air Pavillion

Evening

Welcome

Robert J. Ursano, M.D.

Future Battlefield Ecology:
Situation, Mission & Execution

Craig H. Llewellyn, M.D.

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Saturday 17 June

Morning

7:30 am Breakfast

8:30 am Introduction

Robert J. Ursano, M.D.

9:00 am Plenary Discussion I

Harry C. Holloway, M.D.

10:00 am Break

10:30 am Gender, Military Stress
& PTSD

Jessica Wolfe, Ph.D.

Noon Lunch

Afternoon → Evening

Military Women: Health
Stress & Performance

David H. Marlowe, Ph.D.

Steven Nice, Ph.D.

James R. Rundell, M.D.

Break

3:00 pm

Small Groups: Session I

3:30 pm

(Pre-Dinner Break)

5:00 pm

Dinner

7:00 pm

Informal Gathering

The Airlie Pub

8:30 pm

Sunday 18 June

Morning

7:30 am Breakfast

8:30 am Small Groups: Session II

10:00 am Break

10:30 am Plenary Discussion II

Robert J. Ursano, M.D.

Noon Lunch & Adjourn

APPENDIX C

Trauma, Stress & Health:

*Background readings related to
Military Women in
Combat Deployment & Contingency Operations*

The Arlie House
Arlie, VA

16-18 June 1995

DEPARTMENT OF PSYCHIATRY
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Trauma, Stress & Health:

Military Women in Combat Deployment & Contingency Operations

This conference brought together national and international, military, academic and civilian experts that addressed the accumulated knowledge of extreme stress on women's health and performance and resulting operational needs of command; training; medical care; and programmatic objectives for further research. Conference members worked together on integrating cutting-edge scientific and military data that will provide the basis for developing mission-specific recommendations for tri-service distribution. The following readings were distributed to attendees prior to the conference as background material.

This conference was held as a part of Research

sponsored by:

Defense Women's Health Research Program
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

Trauma, Stress & Health:

Military Women in Combat Deployment & Contingency Operations

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MISCELLANEOUS MATERIAL

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Gender, Stress, and Health

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Studying men and women and differences between them has long been a goal for researchers in health psychology. Recent advances in this endeavor, reflected in this special issue on the topic, have led to important information about the relationships between health and behavior. Of particular interest are possible differences in psychophysiological response, stress, and immune function. Clearly, more inclusive research strategies hold great promise for future scientific discoveries.

Key words: stress, gender differences, immune function, women's health, men's health

This issue of *Health Psychology* is concerned with gender and health. It has become increasingly apparent that men and women are at differential risk for a variety of illnesses and that age-old myths about why women lead longer lives are complicated by a bewildering array of social, psychological, and physiological variables and processes. One can trace differences between men and women along any of a number of dimensions, including differences in stress appraisal and/or response, eating, drug use, smoking, work, social networks, health behavior, and so on. So many possibilities could account for observed differences that it is not possible to deal with all of them here. What we have tried to do instead is to compile a collection of representative work in the broad area of gender and health that not only presents findings on relevant issues but also reflects a variety of perspectives and approaches to studying the causes and consequences of gender-linked processes. We believe that this collection illustrates the wealth of information that can be gathered on many topics in health psychology if gender differences are carefully considered and analyzed.

To illustrate some of the underlying themes in this literature and some of the complexities involved in unraveling the links among various aspects of gender and health, we briefly review several issues using stress as a framework for this discussion. This choice was not dictated by the relative importance of stress in shaping health so much as by convenience; the breadth of stress effects and the ubiquitous role of stress in altering healthy states make it a useful representative of the broader biopsychosocial milieu in which we live and die. Further, it has been linked to differences in health and illness among many different groups of people and, in particular, provides a rich array of points of interaction with gender. As we note later, differences in stress appraisal, in coping, or in one of many different forms of response or adaptation could singly or together predispose men and women to different illnesses and health problems.

We have also chosen to deal in some detail with specific aspects of stress and how they may vary with gender. Bodily

responses during stress appear to be among the most likely aspects of this process to affect health: Cardiovascular and endocrine changes may contribute to heart disease or vascular damage in several ways; hormonal and immune system changes can contribute to development and progression of cancer and HIV disease; and other physiological consequences of extended stress are likely to affect us in important ways (e.g., Schneiderman, 1983; Solomon & Temoshok, 1990). To the extent that these aspects of stress responding vary among men and women, consideration of them here is useful. Because of a relative lack of attention to immune system function and gender, we have elected to provide a brief review of this nascent literature. After considering the importance of studying gender and health issues and clarifying the focus of this area, we discuss the nature of gender differences using stress as a vehicle for this discussion. Then we consider psychophysiological differences between women and men, again in the context of stress, and consider what we know about gender differences in immune system function. Finally, these discussions are used to illustrate what can be done in this area of research and how its applied implications translate into needed investigation.

A great many differences in health associated with gender are stress related. Mental health, for example, varies considerably. Women are more likely than men to be depressed, though differences in bipolar disorders appear less clear than other forms of depression (Boyd & Weissman, 1981; Weissman & Klerman, 1977). Recent studies also indicate greater prevalence of phobia, panic disorders, and obsessive-compulsive disorders among women than men (Cleary, 1987). Antisocial personality disorders, substance abuse, and suicide appear to occur more often among men (Cleary, 1987; Fidell, 1982; Maris, 1981).

Physical health analyses also show that men and women differ in the types of illnesses that they develop and in causes of death. On the surface, this may not be apparent, because the primary illnesses are similar: Both men and women exhibit highest death rates from cardiovascular diseases, cancers, and cerebrovascular diseases. The incidence of chronic obstructive pulmonary diseases and death from accidents are among the top five causes of death for men, whereas pneumonia and influenza round out the top five causes of death for women (Verbrugge, 1985). Yet, life expectancy for women is about 7 years longer than that for men, and this difference is derived

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from greater female survival at nearly every age; differences in death rates among infants, teens and young adults, and middle-agers all reflect greater female survival (Cleary, 1987; Verbrugge, 1985). It is only once we have passed 60 years that the "advantages" afforded women dissipate.

One myth—that women are healthier because they experience less stress, particularly at work—appears not to be true. Women enjoy greater survival at nearly every age, and research has not shown corresponding increases in women's health problems as more and more women have entered the workplace. Some studies have suggested that this trend could increase the disparity between men and women (Waldron & Herold, 1984). The possibility that differences in survival could be due to hormonal differences, particularly sex hormones, has also been considered, but this hypothesis does not appear to be sufficient to explain differential mortality rates either. For some diseases, such as heart disease, it is more a matter of when men or women become severely ill and die rather than whether they do so. Despite the fact that primary causes of death are comparable, the rates at which men and women become ill vary.

Some illnesses show the opposite trends, exhibiting greater prevalence in women, and appear in many cases to be related to immunity. Women are more likely to develop autoimmune diseases, are at greater relative risk from pneumonia and influenza than are men, and experience more morbidity from acute illnesses or chronic diseases that are not fatal (Cleary, 1987). Women are also more likely to visit physicians or seek health care, so some of these differences may be artifacts of increased reporting rather than illness. Although many of these differences appear to be narrowing as diet, awareness of risk factors, use of drugs, changes in socialization and role expectations, and other factors have changed, there still appear to be substantial differences in the mental and physical health of men and women.

WHAT ARE GENDER DIFFERENCES?

The articles in this issue are not restricted to women's health issues or men's health issues *per se*. Instead, they focus on differences between men and women at several levels of analysis. These differences may be biological or behavioral, and in most cases reflect the interaction of several levels. Many investigators ascribe gender differences to socialization and dismiss the extensive differences in biological foundations, maturation rates, and reproductive roles that surely contribute to differences in how sex roles are defined. Others narrow their focus to a single hormone or organ system, ignoring the context in which these events occur. We have taken gender differences to reflect any and all differences between women and men, seeking ultimately to understand differences in health outcomes. Thus, different behaviors, responses during stress, environmental experiences, and biological processes are seen as contributing to overall variation in the health and well-being of women and men (see Kaplan, Anderson, & Wingard, this issue).

Consider, for example, how gender might mediate the effects of stress on health. First, one could consider the

different ways in which stressors might be appraised and how gender might influence perceptions and interpretations. Differential socialization patterns, socially derived needs or roles, or a variety of other factors could predict differences in appraisal leading men and women to diverge in what they consider stressful or how threatening a particular stressor might be. One of the earliest findings in the study of gender differences in stress response was that reported distress is not always parallel to physiological response and that women appeared to report relatively more distress (e.g., Collins & Frankenhauser, 1978; Frankenhauser, Dunne, & Lundberg, 1976). Whether this phenomenon reflects a meaningful difference in appraisal, a greater willingness among women to report distress, or is due to some other perceptual factor, it is clear that women and men view some aspects of their world in different ways and that differences in how they interpret what happens to them could be important in determining how much stress is experienced (see Barnett, Davidson, & Marshall, this issue).

At another level, coping with stress might be different. Research does not suggest that this is the case; studies using coping inventories report few if any differences in preferred coping strategies between men and women (e.g., Hamilton & Fagot, 1988). However, it makes sense that some differences exist. Women generally report more social support and greater use of support networks than do men, suggesting that they are more likely to use this asset, whereas men, who are more likely to derive support from one other person or a small group of friends, are less likely to do so (see Shumaker & Hill, this issue). Bereavement, perhaps, provides the best example of this difference. Women, after losing a spouse, are generally less likely to become ill or to die than are men, possibly because they have a more extensive support network to help them grieve, whereas men (who may have invested heavily in the support provided by the deceased spouse) may have few remaining options available (e.g., Berkman & Syme, 1979; Stroebe & Stroebe, 1983).

The ways in which gender mediates stress and affects health can be seen better if we consider coping in terms of drug use or other "unhealthy" behaviors. Cigarette smoking may be viewed as a coping behavior: Stress appears to increase smoking among smokers, whereas smoking can reduce discomfort and focus attention on a task and is apparently effective in improving negative emotional tone associated with stress (Grunberg & Baum, 1985). If men and women differ in what they view as stressful or avoid alternative methods of mood regulation, stress-related smoking could also vary (see Grunberg, Winders, & Wewers, this issue). Similarly, drug and alcohol use may reflect differences between women and men in a variety of ways, many of which may derive from stressful or traumatic events (see Lex, this issue). Eating behavior is also important, and differences here may indicate that coping by altering behaviors that directly affect health is critical to understanding the consequences of stress (see Rolls, Fedoroff, & Guthrie, this issue).

At still another level, stress involves peripheral psychophysical and biochemical changes that could prove to be important. The magnitude and duration of blood pressure changes during stress appear to be important, and are affected by environmental and constitutional factors (Fleming, Baum,

Davidson, Reitan, & McArdle, 1987; Krantz & Manuck, 1984). Men exhibit larger blood pressure increases than do women (see Matthews, Davis, Stoney, Owens, & Caggiula, this issue), and these differences could contribute to differential rates of hypertension and heart disease among women and men. Similarly, endocrine and lipid responses are different. However, the relationships between these changes and stress-related health consequences are complex, as for example, differences in sex hormones may play protective roles in guarding against atherosclerosis in women which can be altered by menopause and/or hormone replacement. Men also exhibit greater secretion of catecholamines than do women during acute stress, though this difference is not always found and may reflect different rates of response decay and return to resting levels rather than absolute differences in magnitude of response (Ratliff-Crain & Baum, 1990).

Finally, there are apparent differences in the ways in which the central nervous system integrates and responds to stress-related information or to physiological disequilibrium of bodily systems. For example, a bolus administration of corticotropin-releasing hormone (CRH; normally released in the hypothalamus) appears to elicit much larger pituitary responses among women than men and greater secretion of adrenocorticotrophic hormone (ACTH) by women than by men (Gallucci et al., 1990). This hypersecretion of ACTH is not reflected in larger cortisol responses but may be related to longer lasting elevations of cortisol in the face of ACTH release (Gallucci et al., 1990). When CRH was administered, or when ACTH was administered directly, men and women responded comparably in cortisol release over the course of an hour. After this period of time, however, men showed some decrease in cortisol levels, whereas women did not.

This extended example serves to illustrate the complexity of the relationship between stress and health and the many ways in which gender differences can mediate this relationship. It also reveals the many levels at which being male or female may affect how we behave, how we live, and how we die. The data suggest that we die at different rates and in some cases from different illnesses, but the variation is enormous. We must understand the variance in these relationships before we can fully understand the relationships themselves and apply this knowledge to maintain good health.

This brief discussion of gender, stress, and health also highlights the many levels at which gender differences are important. We are not dealing only with social variables or physiological variables, but rather with an array of differences in how we are treated by others, how we were raised, how we respond to things, how we see things, and so on. The articles in this issue are intended to extend across many of these levels, considering the importance of social and physiological responses to stress, appraisal of the environment, and the costs of preferred behaviors.

One area that has not been covered extensively in this collection concerns peripheral psychophysiological response differences, including hemodynamic, endocrine, and immune system activity. Research suggests that men and women differ in bodily reactions to stress or challenge and these differences appear to be more than reflections of intensity of experience or of perceived threat. Matthews et al. (this issue) discuss the possibility that some of these differences are associated with

the gender relevance of situations in which people find themselves, but this alone does not appear to provide a satisfactory explanation for divergent bodily responses. Hormonal differences do not suffice either, and what appears certain is that the way in which men and women respond physiologically is a joint function of the many levels of influence we have already discussed.

GENDER AND PHYSIOLOGICAL RESPONSES

The study of psychophysiological differences between men and women has focused primarily on blood pressure, heart rate, and sympathetic hormones. This research has indicated that men exhibit larger increases in blood pressure when stressed or challenged, regardless of whether basal blood pressures were comparable (Dembroski, MacDougall, Cardozo, Ireland, & Krug-Fite, 1985; Manuck, Craft, & Gold, 1978; Stoney, Davis, & Matthews, 1987). Heart rate changes show the opposite pattern, with women exhibiting the larger increases (Collins & Frankenhaeuser, 1978; Jorgenson & Houston, 1981; Stoney et al., 1987). Research has also addressed differences in endocrine activity, primarily in adrenal hormones such as epinephrine and cortisol (Frankenhaeuser et al., 1976; Gallucci et al., 1990; Lundberg & Forsman, 1979; Van Doornen, 1986). Interpretation of this literature, however, has been tentative. Because none of these differences in response co-vary with gender across situational and individual differences unrelated to gender, it is possible that differences in estrogens or androgens that are a defining characteristic of sex might affect these other systems.

The role of sex hormones in generating differences between men and women has received a great deal of attention. As a clear biological difference between the sexes the relative presence or absence of estrogen, progesterone, and testosterone are clear markers for study and constitute a basic manifestation of these differences. Further, they have been implicated in some of the dynamics affecting health: Estrogen appears to provide some protection against atherosclerosis and cardiovascular reactivity to challenge (e.g., Aslan, Nelson, Carruthers, & Lader, 1981; Polefrone & Manuck, 1987), and testosterone appears to increase some of these risk factors (Leshner, 1978). However, the data regarding the role of these hormones do not suggest that all of the variance in response is due to these endocrine variables.

Research has not addressed sex differences in immune function as they might affect infectious illnesses, autoimmune diseases, cancers, or even AIDS or HIV disease. However, stress does affect immune function (e.g., Kiecolt-Glaser & Glaser, 1987) and differences in how people respond to stress appear to be associated with stress-induced immune function change (Zakowski, McAllister, & Baum, 1990). A brief review of this literature indicates that there are gender differences in resting immune function related to sex hormones that are theoretically consistent with women's elevated risk of autoimmune diseases. However, research has primarily addressed hormonal mechanisms by which these differences are achieved and this approach is not sufficient to understand how these variables interact.

Immune Function

Several differences in immune function between men and women appear to be relatively consistent. Women exhibit higher immunoglobulin levels than do men and mount larger antibody responses to a variety of pathogens (e.g., Michaels & Rogers, 1971; Patty, Furesz, & Boucher, 1976; Rhodes, Scott, Markham, & Monk-Jones, 1969). At the same time, women's cell-mediated immune responses appear to be weaker than men's (Ansar, Penhale, & Talal, 1985), although these differences do not correlate with differences in tumor rejection or viral defense (Schuurs & Verheul, 1990). Pregnancy further reduces certain cellular functions among women: Mitogen-induced cell proliferation is decreased during pregnancy, as are rejection of skin grafts, natural killer cell activity, and cytotoxic T-cell activity (e.g., Anderson & Munroe, 1962; Asari, Iwatani, Amino, Tanizawa, & Miyai, 1989; Finn, St. Hill, Govan, Ralfs, & Gurney, 1972; Gabrilovac et al., 1988; Putillo, Hallgren, & Yunis, 1972).

Sex hormones appear to be related to these differences. Through puberty, boys exhibit greater predisposition to allergies than do girls, but this changes when testosterone levels increase in males and estrogen levels increase in females (Wormald, 1977). That these hormones affect immune function is further supported by the discovery of receptors for estrogen and androgens on lymphoid cells or organs (Cohen, Daniel, Gordiev, Saez, & Revilland, 1983; Grossman, Sholiton, & Helmsworth, 1983; McCruden & Stimson, 1984; Stimson, 1988). Administration of estradiol or of anti-estrogens such as tamoxifen appear to stimulate blastogenic responses to pokeweed (Paavonen & Andresson, 1985). Progesterone increases production of immunosuppressive factors by endometrial tissue, and women taking oral contraceptives derived from progesterone or estrogen exhibit reduced proliferative response to PHA mitogen (Gerretsen et al., 1979; Wang et al., 1988). Menopause is associated with increases in IL-1 production which is reversible by estrogen replacement (Pacifci et al., 1989).

The conclusions one may draw from this relatively small literature are limited, but available data suggest that the principal sex hormones have immunological effects. Estrogen appears to have greater effects on B-cells and antibody production—inhibiting T-suppressor-cell function but stimulating antibody response (Schuurs & Verhuel, 1990). Androgens, on the other hand, appear to interfere with maturation of B-cells and some subsets of T-cells (Grossman, 1984). Whether the influences of these hormones are great enough to produce observed differences between men and women is not clear, but the evidence supports the notion that hormonal activity is involved in these differences.

Although it may be coincidental that women exhibit stronger antibody responses and weaker T suppressor responses while experiencing a greater incidence of autoimmune diseases than do men, it is likely that these differences are related. Research has indicated a large difference in prevalence of autoimmune disease: During reproductive age, women show two times men's risk for multiple sclerosis, three times men's risk for rheumatoid arthritis, and nine times men's risk for systemic lupus (Inman, 1978; Lahita, 1985). Differences in lupus and rheumatoid arthritis are more pronounced during

reproductive age, and syndromes that elevate estrogen and decrease testosterone appear to increase the incidence of arthritis (Lahita, 1985; Stern, Fishman, Brusman, & Junkel, 1977). Abnormal production and/or metabolism of estrogen, testosterone, dehydroepiandrosterone (DHEA), and dehydroepiandrosterone sulphate (DHEA-S) have also been linked to autoimmune diseases (e.g., Inman, 1979; Lahita, 1985).

Although women are more likely to be victimized by autoimmune diseases, are more likely to exhibit hormonal profiles that are associated with autoimmune diseases, and show immunologic profiles that could be involved in the pathogenesis of these illnesses, the precise mechanisms underlying differences in morbidity are not known. Epidemiological studies indicate that the incidence of rheumatoid arthritis is halved in women using oral contraceptives containing estrogen and progesterone and that severity of disease is affected by oral contraceptive use (e.g., Blais & Demers, 1962; Gilbert et al., 1964; Vandenbrouke et al., 1982). This finding suggests that sex-linked hormonal and immunological patterns are involved. Such conclusions are buoyed by findings indicating that men who have autoimmune disorders are also more likely to exhibit antibodies against the estrogen receptor (Feldman, 1987).

These studies, as well as a large literature on animals, suggest that estrogen facilitates or contributes to the increased incidence of autoimmune diseases in women, whereas androgens and progesterone serve a protective or nonfacilitative function. Studies also indicate that women exhibit immunological predispositions that could contribute to autoimmunity and that estrogen and androgens are also associated with these tendencies. Given that such differences exist, presumably, in the majority of men and women, whereas autoimmune diseases do not, the basic physiological differences discussed here may provide information about the mechanisms involved but do not, by themselves, account for illness.

Much remains to be done in this area. We know almost nothing about interactions between sex hormones and other endocrine activity or the effects of such interactions on immune function. We know very little about how women and men differ in immune function during or after stress or whether such differences would affect susceptibility to disease. Given that relatively few clear conclusions can be drawn about such variables as menstrual cycle phase in trying to sort out how men and women differ in immunity, we have a great deal left before us that must be clarified. However, that hormonal activity varies during stress among women and men suggests that there is much to be learned. Either alone or in combination with sex hormones, differential release of ACTH, cortisol, catecholamines, endogenous opioid peptides, or a variety of other substances could very well exert unexpected or unexplained effects on immunity and health.

TOWARD A HEALTH PSYCHOLOGY OF MEN AND WOMEN

Our emphasis here has been on output or processing at the physiological level: hormonal and immune system at resting or unchallenged levels interacting to potentially predispose people to illness. Clearly, we are not suggesting that we stop here; doing so would belie the excitement and opportunity that

multilevel studies of gender and health offer. If we overlay differences in stress response, appraisal, use of psychosocial assets, and the like, we can again begin to appreciate the great complexity of health-behavior relationships. We believe that psychology, and science in general, has too long focused its attention on the mood, behavior, and health of young men. This limited focus has led to many unfortunate generalizations and has provided us with incomplete information about how we behave, why we are healthy, and so on. This does not mean that the pendulum should swing back the other way so forcefully that we study only women, but rather that we should adopt a broader perspective in which gender, age, and cultural variables are more prominently considered. Research on health and behavior should consider men and women—not because it is discriminatory not to do so—but because it is good science. The study of women and men, of young and old, of Blacks, Whites, Asians, Hispanics, and Native Americans will all help to reveal psychosocial and biological mechanisms that are critical to understanding mortality, morbidity, and quality of life. Studying gender differences specifically—in stress, smoking, drug use, eating behavior, and the like—should facilitate discovery of ways to avoid and treat (i.e., with education, medication, or behavioral controls) many of our current and future health problems.

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Trends in Alcohol, Illicit Drug, and Cigarette Use among U.S. Military Personnel: 1980-1992

ROBERT M. BRAY, LARRY A. KROUTIL, AND MARY ELLEN MARSDEN

Researchers and policymakers have begun to focus attention in the past few years on a broad array of health issues facing members of the U.S. military, including alcohol, other drug, and cigarette use by the force.^{1,2} Heavy drinking, other drug use, and tobacco use, as well as other poor health practices by military personnel, interfere with the Department of Defense mission of maintaining a high state of military readiness among the armed forces. In addition, the DoD considers any use of illicit drugs to constitute abuse because of the potentially deleterious effect on military discipline resulting from defiance of laws and regulations. Consequently, a central aim of DoD policy is to prevent and minimize the effects of heavy alcohol, other drug, and tobacco use on military performance and to promote behaviors that contribute to health and fitness.

Historically, however, social norms within the military have tended to encourage alcohol use and cigarette smoking. Bryant notes that within the predominantly male military population, heavy drinking and being

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able to "hold one's liquor" have served as tests "of suitability for the demanding masculine military role."³ Alcoholic beverages have been available to military personnel at reduced prices at military outlets and, in the past, during "happy hours" on base.^{4,5} Moreover, alcohol has been used in the military to reward hard work, ease interpersonal tensions, and promote unit cohesion and camaraderie.⁶ Similarly, practices and policies related to cigarette use, such as the "smoke break,"^{7,8} and the availability of cigarettes at reduced prices at military outlets⁹ may have created an environment that encouraged personnel to smoke.

In 1986, the DoD established a formal, coordinated, and integrated health promotion policy (DoD Directive no. 1010.10) that was designed to improve and maintain military readiness and the quality of life of DoD personnel and other beneficiaries.¹⁰ The health promotion directive identified six broad program areas, two of which address substance use: smoking prevention and cessation, physical fitness, nutrition, stress management, alcohol and other drug abuse prevention, and hypertension prevention.

Smoking cessation and prevention programs within the military aim to create a social environment that supports abstinence and discourages the use of tobacco products. The programs also seek to provide smokers with encouragement and assistance in quitting smoking. DoD policy prohibits smoking in work areas shared by smokers and nonsmokers, auditoriums, conference rooms, classrooms, and certain other common areas. Presentation of information on the health consequences of smoking is required when personnel enter the service, as part of routine physical and dental examinations, and at the time of a permanent change of station (PCS). On entry to the military, nonsmokers are encouraged to refrain from smoking, and smokers are encouraged to quit. In accordance with these antismoking efforts, one of the Public Health Service's Healthy People 2000 objectives is to reduce the prevalence of cigarette smoking among military personnel to no more than 20 percent by the year 2000.¹¹

Alcohol and other drug abuse prevention programs aim to prevent the misuse of alcohol, eliminate the use of illegal drugs, provide counseling or rehabilitation to abusers who desire assistance, and provide education to various target audiences. Specific measures noted in DoD Directive no. 1010.4 include prohibiting the possession, sale, or trafficking of illicit drugs or drug-related paraphernalia; detecting and refusing admission to illicit drug- or alcohol-dependent inductees or civilian job candidates; providing education and training for commanders, supervisors, other military personnel, civilian employees, and families of DoD personnel; and working with other national government and nongovernmental alcohol

and other drug abuse prevention efforts.¹² Part of the military's deterrence and detection program, as described in DoD Directive no. 1010.1, includes drug urinalysis.¹³

Prior research among military personnel^{14,15} and civilians^{16,17} has documented a decrease in the prevalence of use of alcohol, other drugs, and cigarettes during the 1980s and continuing into the 1990s. For cigarette smoking, this decline is a reflection of a longer-term trend toward lower rates of use that began after the first report of the Surgeon General's Advisory Committee was released in 1964.¹⁸ Decreases in alcohol and other drug use have occurred more recently.

This article presents findings on current trends among active-duty military personnel regarding alcohol use, illicit drug use, and cigarette smoking. Findings are based on data from the five Worldwide Surveys of Substance Abuse and Health Behavior among Military Personnel. The first Worldwide Survey was conducted in 1980 by Burt and Associates,¹⁹ with subsequent surveys conducted in 1982, 1985, 1988, and 1992 by the Research Triangle Institute.²⁰⁻²⁵ To permit examination of trends, a common methodology and a core set of items on alcohol use, other drug use, and tobacco use have been used throughout the survey series.

Methods

Sampling Design and Data Collection

The sampling designs and data collection methods have been similar throughout the survey series and are illustrated with the methods used for the 1992 survey. The 1992 sample was selected using a deeply stratified, two-stage, two-phase probability design. The eligible survey population consisted of all active-duty military personnel except recruits, service academy students, persons absent without official leave (AWOL), and persons who had a PCS at the time of data collection. The first stage of sampling involved selection of major military installations stratified by service (Army, Navy, Marine Corps, Air Force) and world region (Americas, North Pacific, Other Pacific, Europe). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by military pay grade, including three enlisted pay grade strata (E1-E4, E5-E6, E7-E9) and three officer pay grade strata (warrant officers in grades W1-W4 and commissioned officers in grades O1-O3 and O4-O10). The sample was selected to be representative of the active-duty force worldwide. Officers were oversampled because of their smaller numbers.

cinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, and "designer drugs." In addition, we created a summary index for estimating the prevalence of use of any illicit drug that referred to nonmedical use of one or more of the 11 categories of drugs.

Cigarette use was measured in terms of lifetime numbers of cigarettes smoked and the average daily number of cigarettes smoked in the past 30 days. Current smokers were defined as military personnel who reported that they smoked at least 100 cigarettes in their lifetime and who smoked at least once in the 30 days prior to the survey.

Analysis Procedures

Population prevalence estimates and associated standard errors were produced from the weighted survey data using the SURVEY DATA ANALYSIS (SUDAAN) software package.²⁴ The direct standardization method was used to adjust prevalence estimates after 1980 to reflect demographic changes in the military over time. Pairwise *t*-tests were conducted to test for significant differences between the prevalence estimates described in this paper. Tests of significance were conducted between consecutive survey years (e.g., 1988 vs. 1992) and between the first and last survey years (i.e., 1980 vs. 1992).

Findings

Overall Trends in Alcohol, Other Drug, and Cigarette Use

Fig. 1 presents trends over the Worldwide Surveys of the active force who had engaged in heavy alcohol use, any illicit drug use, and any cigarette use during the past 30 days. It also provides information about the statistical significance of changes in substance use between each pair of survey years. As shown, all three measures of use declined significantly between 1980 and 1992, although the rate of decline varied for each of the substances and between each of the five surveys.

More specifically, the prevalence of heavy alcohol use declined significantly from 20.8 percent for all military personnel in 1980 to 15.2 percent in 1992. Heavy drinking was relatively stable from 1980 to 1985, decreased significantly between 1985 and 1988, and then remained at about the same level between 1988 and 1992. The prevalence of any

During data collection, respondents anonymously completed self-administered questionnaires that took about 55 minutes on average to answer. Most respondents (86 percent in 1992) attended group sessions at over 60 installations where questionnaires were administered by civilian data collection teams. Eligible personnel who did not attend group sessions were mailed a questionnaire, along with an explanation of the purpose and anonymity of the survey and instructions for completing and returning the questionnaire.

These procedures produced large sample sizes and respectable response rates for each of the surveys. The sample sizes were 15,268 in 1980, 21,936 in 1982, 17,328 in 1985, 18,673 in 1988, and 16,395 in 1992. Response rates ranged from 77 to 84 percent. To produce the military population prevalence estimates described in this paper, the survey data were weighted to reflect respondents' probabilities of being selected, and adjustments were made for the potential effects of nonresponse.

Description of Measures

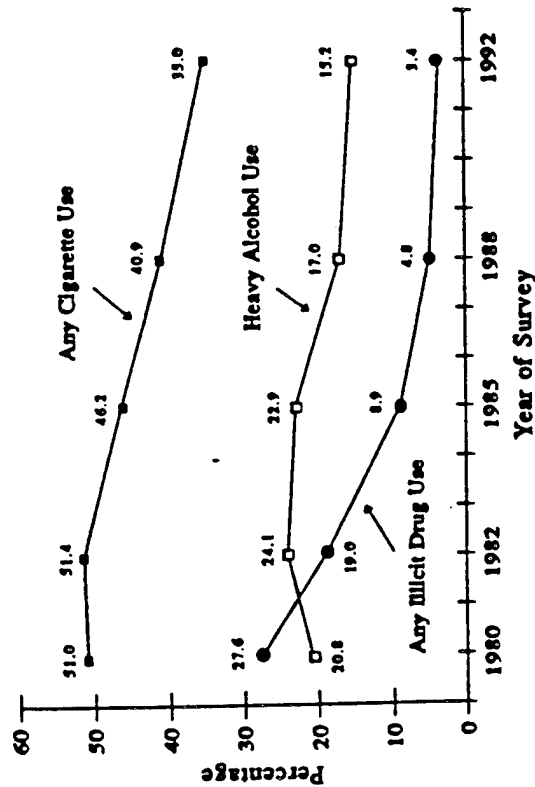
Alcohol use was measured in terms of two summary indexes: average daily ounces of absolute alcohol (ethanol) and drinking levels. The ethanol index was computed as a function of the amount of ethanol contained in the ounces of beer, wine, and liquor consumed on a typical drinking day during the past 30 days, the frequency of use of each beverage, and the amount of ethanol consumed on atypical ("heavy") drinking days during the past 12 months. The index represents average daily ounces of ethanol consumed during a 12-month period.

The drinking-level classification defined five drinking-level groups (abstainers, infrequent/light, moderate, moderate/heavy, and heavy drinkers), based on quantity and frequency data during the past 30 days for the respondent's primary beverage. Abstainers drank once a year or less. Those in the infrequent/light category drank one to four drinks per occasion one to three times a month. Those in the moderate category drank (a) at least one drink per occasion once a week, (b) two to four drinks per occasion two to three times a month, or (c) five or more drinks per occasion once a month or less. Those in the moderate/heavy category drank two to four drinks per occasion at least once a week or five or more drinks per occasion two to three times per month. Those in the heavy category drank five or more drinks per occasion at least once a week.

Illicit drug use was measured in terms of the prevalence of nonmedical use of marijuana or hashish, phencyclidine (PCP), LSD or other hallucinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, and "designer drugs." In addition, we created a summary index for estimating the prevalence of use of any illicit drug that referred to nonmedical use of one or more of the 11 categories of drugs.

Figure 1

Trends in Substance Use, Past 30 Days, Total DoD, 1980-1992



Note: Increases in heavy drinking between 1980 and 1982 were statistically significant ($p < .05$); decreases between 1985 and 1988 and between 1980 and 1992 were statistically significant ($p < .05$). Decreases in illicit drug use between 1980 and 1982, 1982 and 1985, 1985 and 1988, 1988 and 1992, and 1980 and 1992 were statistically significant ($p < .05$). Decreases in cigarette smoking between 1982 and 1985, 1985 and 1988, 1988 and 1992, and 1980 and 1992 were statistically significant ($p < .05$).

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

illicit drug use during the past 30 days declined sharply from 27.6 percent in 1980 to 3.4 percent in 1992. The rate of decrease in illicit drug use was much greater than for heavy alcohol use, and the decreases were statistically significant between each of the five surveys.

The percentage of military personnel who smoked cigarettes also decreased during the 12-year period, from 51.0 percent in 1980 to 35.0 percent in 1992. Smoking rates remained nearly constant between 1980 and 1982, but decreased significantly between each of the later surveys. Despite these declines, the prevalence of any smoking in 1992 was still

well above the 20-percent target set for the military by the year 2000.²⁵

Alcohol consumption data also indicate a decline in overall alcohol use. Fig. 2 shows that the average amount of ethanol consumed per day has decreased substantially since 1980. Overall, average daily intake decreased from 1.48 ounces per day in 1980 to 1.41 in 1982, 1.22 in 1985, 0.96 in 1988, and 0.81 in 1992. This represents a 45-percent decrease over the 12-year period. The decreases from 1982 to 1985, from 1985 to 1988, and from 1988 to 1992 were statistically significant.

In addition, the percentage of personnel who were abstainers from alcohol increased significantly over the 12-year period, from 13.5 percent in 1980 to 20.4 percent in 1992, or approximately one out of five personnel in 1992. The percentage of personnel who were abstainers stayed at approximately 12 to 14 percent from 1980 to 1985 and then increased significantly in 1988 to 17.2 percent and in 1992 to 20.4 percent.

Overall, then, the military showed significant declines in heavy alcohol use, average ethanol consumption, illicit drug use, and cigarette use from 1980 to 1992. Although average ethanol consumption, illicit drug use, and cigarette use declined significantly between 1988 and 1992, heavy drinking did not.

Trends in Use by Demographic Characteristics

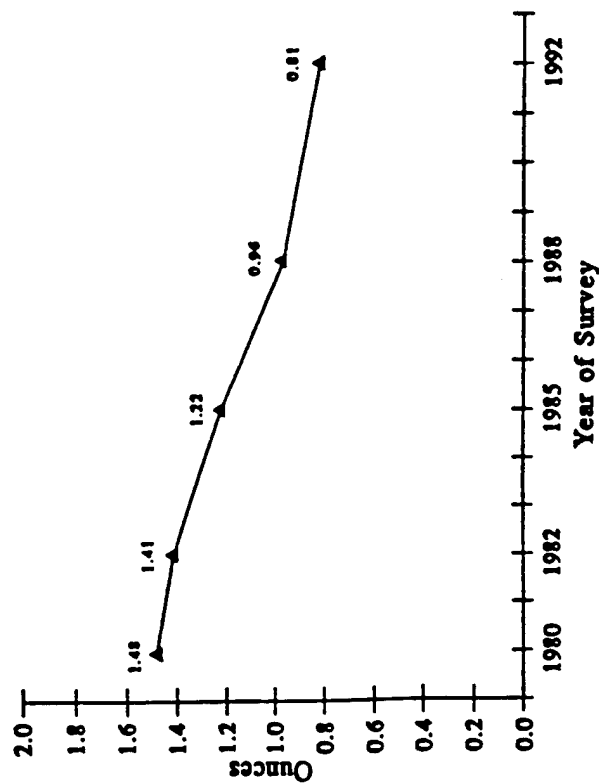
Despite the downward trends observed overall, questions arise about whether these findings are consistent across demographic subgroups and whether certain demographic subgroups may be at higher risk for substance use than other subgroups. Even though the majority of personnel show declining rates of use, some subgroups may not; further, some subgroups may consistently be more likely than others to drink heavily, use illicit drugs, or smoke cigarettes. To address these issues, we examined trends in heavy alcohol use, illicit drug use, and cigarette use within demographic subgroups.

Tables 1 through 3 present prevalence estimates within demographic subgroups across the five Worldwide Surveys for heavy alcohol use, illicit drug use, and cigarette use, respectively. Data on heavy alcohol use and cigarette smoking are presented for the past month, whereas illicit drug use is assessed for the past year. The past year time period is used for illicit drugs rather than the past month because of the low prevalence in the later years of the survey series.

Heavy alcohol use and illicit drug use are consistently related to education, age, marital status, and pay grade across the entire Worldwide Survey series. Specifically, personnel who had less education, were

Figure 2

Trends in Average Daily Ounces of Alcohol (Ethanol), Total DoD, 1980-1992



Note: Decreases in average daily ounces of ethanol between 1985 and 1988, 1988 and 1992, and 1980 and 1992 were statistically significant ($p < .05$).

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

younger, unmarried, and in the lower pay grades were consistently more likely to drink heavily in the past month and to use illicit drugs in the past year than their counterparts. In addition, married personnel not accompanied by their spouses at their present duty assignments were consistently more likely to drink heavily or to use illicit drugs than married personnel accompanied by their spouses.

Military men also consistently showed a higher prevalence of heavy alcohol use than military women. For illicit drug use, men and women showed similar rates of use from 1980 to 1988. In 1992, however, men were nearly twice as likely as women to have used illicit drugs in the past year.

Data in Tables 1 and 2 also show important differences in trends in

Table 1

Trends in Heavy Alcohol Use, Past 30 Days, for Total DoD, 1980-1992, by Selected Demographic Characteristics

Characteristic	Year				
	1980	1982	1985	1988	1992
Sex					
Male	21.8	25.4	24.4	19.3	17.1
Female	9.6	11.0	8.3	7.1	4.4
Race/ethnicity					
White	21.4	26.5	24.5	17.7	16.5
Black	17.1	18.0	16.5	14.7	10.3
Hispanic	27.4	27.5	28.6	16.7	17.9
Other	18.0	19.9	19.1	16.0	13.7
Education					
Less than high school graduate	40.0	43.7	38.0	28.1	+
High school graduate or GED	26.0	29.2	30.2	23.9	22.4
Some college	16.5	21.3	19.6	14.6	13.2
College graduate or higher	6.7	9.2	7.0	6.4	4.7
Age					
20 and under	33.4	33.0	38.6	23.6	24.5
21-25	24.6	27.9	28.0	23.9	22.5
26-34	13.4	17.4	16.4	13.9	12.3
35 and older	6.8	12.7	10.0	6.1	7.0
Marital status					
Not married	30.5	32.6	33.3	24.6	23.7
Married, spouse not present	24.5	27.1	25.5	15.9	15.8
Married, spouse present	10.3	14.2	13.3	11.6	9.5
Pay grade					
E1-E3	31.7	32.3	35.3	26.1	28.2
E4-E6	20.7	24.2	22.8	19.0	16.2
E7-E9	13.4	16.6	13.3	10.3	9.0
W1-W4	5.5	11.7	11.9	8.6	10.1
O1-O3	7.4	6.5	7.4	6.1	5.5
O4-O10	4.6	6.0	3.6	2.9	2.5
Total DoD	30.8	34.1	32.9	17.0	15.3

Note: Entries are expressed as percentages.

+No estimate reported due to large sampling error.

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

Table 2

Trends in Any Illicit Drug Use, Past 12 Months, for Total DoD, 1980-1992, by Selected Demographic Characteristics

Characteristic	Year				
	1980	1982	1985	1988	1992
Sex					
Male	36.6	26.5	13.6	9.0	6.7
Female	39.0	26.7	12.0	8.4	3.4
Race/ethnicity					
White	36.4	25.9	14.6	9.2	6.6
Black	41.5	29.0	10.0	7.8	4.2
Hispanic	44.9	29.5	11.9	9.5	8.9
Other	29.1	22.3	9.0	8.1	4.4
Education					
Less than high school graduate	60.1	48.0	33.5	13.3	+
High school graduate or GED	45.5	32.6	17.9	12.9	9.0
Some college	32.0	23.3	11.5	7.5	5.5
College graduate or higher	11.4	7.9	2.7	3.0	1.9
Age					
20 and under	62.0	42.9	26.1	15.8	12.9
21-25	50.1	34.3	18.5	13.7	10.3
26-34	19.0	14.6	7.0	6.2	3.8
35 and older	3.7	2.9	1.6	2.2	1.9
Marital status					
Not married	53.9	37.5	20.1	14.7	9.9
Married, spouse not present	34.7	24.0	13.8	12.4	7.1
Married, spouse present	19.4	14.7	7.3	4.4	3.6
Pay grade					
E1-E3	59.0	41.3	22.2	17.7	15.5
E4-E6	36.6	26.1	14.1	9.1	6.3
E7-E9	4.0	3.1	2.1	1.8	1.9
W1-W4	3.6	5.1	1.0	1.5	1.2
O1-O3	9.4	5.6	2.3	2.0	1.2
O4-O10	2.0	1.6	1.2	1.2	1.3
Total DoD	36.7	26.6	13.4	8.9	6.2

Note: Entries are expressed as percentages.

†No estimate reported due to large sampling error.

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

Table 3

Trends in Any Cigarette Use, Past 30 Days, for Total DoD, 1980-1992, by Selected Demographic Characteristics

Characteristic	Year				
	1980	1982	1985	1988	1992
Sex					
Male	51.7	51.9	46.0	41.1	35.7
Female	43.6	46.2	46.2	39.7	31.5
Race/ethnicity					
White	51.2	51.6	47.2	41.8	37.4
Black	50.2	49.3	43.1	37.6	29.0
Hispanic	48.6	50.0	41.4	39.0	31.6
Other	53.3	56.6	43.5	44.2	32.9
Education					
Less than high school graduate	71.4	71.1	77.3	65.6	+
High school graduate or GED	54.5	56.1	52.5	45.6	44.2
Some college	51.7	52.7	47.2	42.7	35.5
College graduate or higher	26.3	29.1	22.2	20.3	14.9
Age					
20 and under	52.7	50.7	45.8	43.3	40.8
21-25	50.7	51.6	46.3	42.5	36.4
26-34	51.4	51.2	45.9	40.0	34.4
35 and older	46.5	52.3	46.0	38.7	32.0
Marital status					
Not married	52.8	51.6	46.5	43.3	37.6
Married, spouse not present	56.2	60.6	52.8	45.3	35.4
Married, spouse present	48.1	49.5	44.6	38.8	33.3
Pay grade					
E1-E3	53.9	53.9	46.5	46.3	43.4
E4-E6	55.6	54.7	51.6	44.5	38.0
E7-E9	56.4	61.0	55.7	47.7	38.4
W1-W4	54.2	56.1	40.3	32.1	26.8
O1-O3	22.5	24.6	17.5	16.2	11.8
O4-O10	25.3	28.0	20.5	17.9	12.3
Total DoD	51.0	51.4	46.2	40.9	35.0

Note: Entries are expressed as percentages.

†No estimate reported due to large sampling error.

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

heavy alcohol use and illicit drug use by race/ethnicity. In each of the Worldwide Surveys, blacks were less likely than whites or Hispanics to be heavy alcohol users (Table 1). In contrast, blacks and Hispanics showed somewhat higher rates of illicit drug use in 1980 and 1982 than whites, but beginning in 1985, the prevalence of illicit drug use was lower among blacks than among whites (Table 2).

With regard to cigarette use (Table 3), military personnel with less education consistently showed a higher prevalence of smoking than personnel with more education. Smoking was also consistently more prevalent among enlisted personnel (pay grades E1 to E9) than among commissioned officers (pay grades O1 to O10). Differences in cigarette smoking by sex, race/ethnicity, age, and marital status were less pronounced across the survey series.

With few exceptions, the trends in the prevalence of heavy alcohol, illicit drug, or cigarette use within demographic subgroups matched the overall trends for all military personnel. Among personnel in pay grades E1 to E3, however, the prevalence of heavy alcohol use increased from 31.7 percent in 1980 to 35.3 percent in 1985, declined sharply to 25.1 percent in 1988, and then increased somewhat to 28.2 percent in 1992. Similarly, the prevalence of heavy alcohol use among warrant officers (pay grades W1 to W4) was actually lower in 1980 than at any subsequent point in the Worldwide Survey series.

Changes in Demographic Composition of Military

Although the data examined thus far show significant decreases in substance use since the Worldwide Survey series began, the question arises of whether these changes might be attributable, at least in part, to demographic changes that have occurred in the military since 1980. The years between 1980 and 1992 were excellent ones for the military both in terms of recruiting and successful retention. As a result, the military now boasts a high-quality force, one that has been shaped in part by changing demographics.

Table 4 presents survey estimates of demographic patterns for the eligible respondent population in the military from 1980 to 1992. These data may differ somewhat from the overall DoD population, since some personnel were not included in the surveys. As shown, the success in the personnel arena has resulted in a force that is better educated, is older, and has a higher percentage of married personnel than it had in the early 1980s—factors that are also associated with a lower prevalence of substance use (Tables 1 through 3). Specifically, in 1980, 54 percent of

Table 4
Estimates of Selected Demographic Characteristics of the Total DoD, 1980–1992

Characteristic	Year			
	1980	1982	1985	1992
Sex				
Male	91.2	90.6	91.0	88.8
Female	8.8	9.4	9.0	11.2
Race/ethnicity				
White	70.7	71.2	72.3	69.4
Black	18.8	16.7	16.9	18.8
Hispanic	4.6	6.9	6.7	8.0
Other	8.8	5.2	4.1	4.1
Education				
Less than high school graduate	4.8	3.7	1.8	0.8
High school graduate or GED	49.2	47.4	47.3	42.1
Some college	30.4	33.8	34.7	37.7
College graduate or higher	16.7	18.3	16.4	19.4
Age				
20 and under	21.3	22.9	17.3	13.8
21–25	36.2	36.6	36.3	30.4
26–34	27.8	27.9	30.4	34.4
35 and older	15.6	13.6	17.0	21.4
Marital status				
Not married	47.3	48.8	44.0	39.5
Married	52.6	51.2	56.0	60.5
Pay grade				
E1–E3	27.1	32.4	28.3	21.0
E4–E6	60.2	47.2	48.6	51.9
E7–E9	8.2	7.4	8.7	10.4
W1–W4	1.1	1.0	0.9	1.0
O1–O3	8.3	8.1	8.7	9.6
O4–O10	8.0	3.9	4.8	6.1

Note: Entries are expressed as percentages.

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

military personnel had no education beyond high school (including personnel with a general equivalency diploma), and 46 percent had some college or a college degree. In 1992, the pattern had reversed; some 39 percent had a high school education or less, and 61 percent had at least some college education.

Shifts in age show that about 57 percent of the military population in 1980 were aged 25 or younger and approximately 16 percent were 35 or older; by 1992, approximately 39 percent were 25 or younger and about

24 percent were 35 or older. This increase in age was also accompanied by an increase in the percentage of married personnel. In the early 1980s, from 51 to 53 percent of military personnel were married, but in 1992, about 63 percent were married.

Although men continued to make up the large majority of the military in 1992, the percentage of women was increasing steadily, from about 9 percent in 1980 to 15 percent in 1992. Similarly, although enlisted personnel comprised over 80 percent of the force in 1992, the percentage of personnel in the junior enlisted pay grades (E1 to E3) declined after 1985 and was under 20 percent in 1992. These increases in the percentages of women in the military and decreases in the percentages of junior enlisted personnel may also have contributed to declines in the prevalence of heavy alcohol and illicit drug use in the military.

Effects of Demographic Changes on Alcohol, Illicit Drug, and Cigarette Use

To examine whether changes in the demographic composition of the military explain the declining rates of use of alcohol, illicit drugs, and cigarettes, we standardized the rates of use for the 1982, 1985, 1988, and 1992 surveys to the demographic distribution for the 1980 survey. Age, education, and marital status were selected as the standardization variables because they exhibited the greatest change over the 12-year period (Table 4). Inclusion of additional variables in the standardization was constrained by sample sizes of the cells resulting from cross-tabulations of the standardizing variables.

For each measure (proportion of heavy drinkers, ounces of ethanol, proportion of illicit drug users, proportion of smokers), estimates of use were calculated for each of the three standardizing cells formed by the cross-tabulation of age, education, and marital status. These estimates were then weighted by the estimated proportion of the 1980 military population that fell into each cell. These standardized or adjusted rates show how the prevalence estimates following 1980 would have looked if there had been no changes in the demographic characteristics of the military from 1980 to 1992.

Table 5 presents the trends in unadjusted (i.e., observed) and adjusted (i.e., standardized) rates of heavy alcohol use, average daily ounces of ethanol, any illicit drug use, and cigarette smoking for the total DoD during the five surveys. For heavy alcohol use, adjusting the rates to reflect demographic changes over time increased the estimates of heavy drinking for the 1982, 1988, and 1992 surveys by about two percentage points on average. That is, if the sociodemographic composition of the

Table 5
Trends in Substance Use, Unadjusted and Adjusted by Sociodemographic Characteristics for Total DoD, 1980-1992

Substance/Type of Estimate	Year of Survey			
	1980	1982	1988	1992
Heavy alcohol use, past 30 days				
Unadjusted	20.8 ^a	24.1 ^a	17.0 ^a	15.2 ^a
Adjusted ^b	20.8 ^a	26.4 ^a	19.3 ^a	16.9 ^a
Average daily ounces of ethanol, past 12 months				
Unadjusted	1.48 ^a	1.41	1.22	0.96 ^a
Adjusted ^b	1.48 ^a	1.38	1.29	1.06 ^a
Any illicit drug use, past 30 days				
Unadjusted	27.6 ^a	19.0 ^a	8.9 ^a	4.6 ^a
Adjusted ^b	27.6 ^a	18.2 ^a	9.7 ^a	6.6 ^a
Cigarette use, past 30 days				
Unadjusted	81.0	81.4	46.2 ^a	40.9 ^a
Adjusted ^b	81.0	82.0	46.9 ^a	42.9 ^a

Note: Estimates of heavy alcohol use, any illicit drug use, and any cigarette use are percentages. For average daily ounces of ethanol, estimates are expressed as mean ounces of ethanol. Significance tests were done between consecutive survey years (e.g., 1980 vs. 1982) and between 1980 and 1992.

^a Comparisons between this survey and the preceding survey are statistically significant at the 95-percent confidence level.

^b Comparisons between 1980 and 1992 are statistically significant at the 95-percent confidence level.

^c Adjusted estimates for 1982, 1985, 1988 and 1992 have been standardized to the 1980 DoD demographic distribution by age, education, and marital status.

^d Estimate is the unadjusted reference value.

Sources: Worldwide Surveys of Substance Abuse and Health Behaviors among Military Personnel, 1980 to 1992.

military in 1982, 1988, and 1992 had been the same as in 1980, rates of heavy drinking would have been even higher than the rates actually observed. For adjusted rates, there was no significant decline in the rate of heavy drinking between 1980 and 1992, although there was for unadjusted rates. This finding suggests that the observed declines in heavy drinking from 1980 to 1992 (when comparing unadjusted rates) were largely a function of changes in the demographic composition of the military during that time.

Standardization had less effect on rates of average daily ounces of ethanol, illicit drug use, and cigarette smoking or on the significance of differences between surveys. For all of these measures, the adjusted data showed the same strong significant downward trend in use between 1980 and 1992 that the unadjusted data showed. Overall, these analyses indicated that the observed declines in average daily ounces of ethanol, illicit drug use, and cigarette smoking were not accounted for by shifts in the sociodemographic composition of the military population between 1980 and 1992.

Discussion

Key Findings

Overall, findings from the Worldwide Surveys indicate steady and notable declines in illicit drug use and cigarette smoking in the military from 1980 to 1992. Moreover, results of the standardized analyses indicate that these declines reflect behavioral shifts that are not explained by sociodemographic changes in the military.

Changes in alcohol use, however, were not as consistent. On the one hand, findings showed an increase in the proportion of abstainers and a corresponding reduction in the average amount of alcohol consumed. On the other hand, findings suggested that there was little or no decline in the prevalence of heavy drinking. In particular, when estimates of heavy drinking were adjusted to reflect changes in the sociodemographic composition of the military, the 1992 rate had not changed significantly from the 1980 rate. This suggests that the observed declines in heavy drinking from 1980 to 1992 (unadjusted rates) were largely a function of changes in the demographic composition of the military. This finding of no substantial change in heavy drinking rates is particularly troubling because heavy drinkers are the subgroup of alcohol users most likely to cause or experience problems as a result of their drinking.

Findings from the Worldwide Survey series also suggest that the subgroups most likely to engage in heavy alcohol use and illicit drug use were personnel who had less education, those who were younger, those who were unmarried, and those in junior enlisted pay grades. Additionally, men were consistently more likely than women to be heavy drinkers. Personnel most likely to be smokers were those in enlisted pay grades and those with less education.

Taken together, these findings suggest that additional military efforts to reduce substance use should target high-use subgroups with appropriate

ate interventions. Interestingly, these results also suggest that rates of heavy alcohol use, illicit drug use, and cigarette use may continue to decline with no interventions if the percentages of older, better educated, female, and married personnel in the military continue to increase. Of course, relying on demographic changes alone to reduce substance use rates would be an unwise strategy given the relatively slow and uncertain pace with which such changes may occur.

One noteworthy change across the survey series was that in 1992 military men were more likely than military women to have used illicit drugs in the past year. This recent pattern is similar to that observed in civilian surveys, such as the National Household Survey on Drug Abuse, in which the prevalence of illicit drug use has tended to be higher among males than among females.²⁶ In contrast, earlier Worldwide Surveys up through 1988 found that military men and women had similar rates of illicit drug use. Future Worldwide Surveys will help to determine whether this gender difference in 1992 is only an isolated event, or whether it might signal a change in demographic correlates of illicit drug use within the military.

Trends in the Civilian Population

The observed declines in use of illicit drugs and cigarettes among military personnel are consistent with declines that have been occurring among the civilian population. Data from the National Household Surveys on Drug Abuse (NHSDAs) indicate that the prevalence of any illicit drug use in the past month among young adults aged 18 to 25 declined from a peak of 37.1 percent in 1979 (subsequent surveys in 1982, 1985, 1988, 1990, and 1991) to 15.4 percent in 1991. Between 1979 and 1990, the past month prevalence declined in each survey year to 14.9 percent in 1990. Among adults aged 26 and older, the prevalence of any illicit drug use in the past month peaked at 8.5 percent in 1985 and was at 4.6 percent in 1991.²⁷

Similarly, the prevalence of current smoking has been declining steadily among the adult civilian, noninstitutionalized population in the United States.²⁸ In 1985, approximately 30 percent of the adult civilian noninstitutionalized population were current smokers; by 1990, the prevalence had dropped to slightly more than one in four adults (25.5 percent).^{29,30}

Although illicit drug and cigarette use have been declining in the civilian population, the prevalence of heavy alcohol use has shown little change, a situation similar to that in the military for adjusted rates of

heavy alcohol use (Table 5). Data from the NHSDAs, for example, indicate that the prevalence of heavy alcohol use (defined as having five or more drinks per occasion on 5 or more days in the past month) among adults aged 21 and older has remained around 5 percent from 1988 to 1991.³¹⁻³³ Similarly, Clark and Hilton found that 23 percent of men and 6 percent of women were in the high volume/high maximum consumption category in 1984; preliminary findings from the 1990 National Drinking Practices Survey indicate no change in the frequency of heavy drinking compared to 1984.^{34,35}

Although rates of illicit drug use and smoking have been declining in both military and civilian populations, direct comparison of rates between the two populations can be misleading because of differences in demographic characteristics in the two populations that are also related to substance use. In particular, the military population is a predominantly young, male population; rates of heavy alcohol, illicit drug, and cigarette use tend to be higher in these subgroups. Although stratification by age and sex may create more homogeneous subgroups for military/civilian comparisons (e.g., military/civilian comparisons among males aged 18-25), there may still be important demographic differences within these subgroups (e.g., education) that may also be related to substance use.

Standardized comparisons between rates of substance use in the military and civilian populations in 1985 indicated that the military had higher rates of heavy alcohol and cigarette use, but lower rates of illicit drug use relative to the civilian population, after the civilian population estimates had been adjusted to take into account demographic differences between the two populations.³⁶ Similar analyses are currently under way comparing military and civilian data from 1988 and 1992.

Validity of Self-Reported Data

Despite the findings described here, policymakers and other researchers may question the validity of self-reported data on substance use, claiming that survey respondents will give socially desirable rather than truthful answers. This issue was particularly relevant to the 1992 survey because of the drawdown in personnel and the concern that service members might not reveal anything about behaviors, such as use of illegal drugs, that could jeopardize their careers.

A monograph edited by Rouse, Kozel, and Richards addressed research on the validity of self-reported drug use.³⁷ A general conclusion emerging from the various reviews reported in this monograph is that

most respondents will be truthful about sensitive issues when the conditions are favorable for them to do so. Such conditions include believing that the research has a legitimate purpose, having suitable privacy for providing answers, having assurances that answers will be kept confidential, and believing that those collecting the data can be trusted.³⁸ Throughout the Worldwide Survey series, rigorous procedures have been followed to encourage honest reporting. Specifically, questionnaires were answered privately and anonymously, civilian teams collected the data, and responses were kept confidential and were not shown to military personnel at the installation.

Support for the validity of data reported in the Worldwide Survey series derives from this body of research and corroborating urinalysis data from military personnel. Early data on urinalysis testing showed a decline in opiate use from 41 per 10,000 urine tests in 1977 to 40 in 1978, 27 in 1979, 29 in 1980, and 14 in 1981.³⁹ More recent test results have continued to show a declining pattern during the 1980s to the present (R. L. Hilderbrand, Office of Department of Defense Coordinator for Drug Enforcement Policy and Support, personal communication, September 1992).

Limitations of the Data

Although the declines in illicit drug use and cigarette smoking in the military come at a time when antidrug and antismoking efforts in the military have intensified,⁴⁰⁻⁴² Worldwide Survey data are not designed to evaluate the effectiveness of military policies and programs. Specifically, data from the Worldwide Surveys are cross-sectional, not longitudinal, and come from somewhat different populations due to the high turnover in military personnel. Many individuals serving in the military in the early 1980s were no longer serving in 1992. Given the all-volunteer nature of the force, a self-selection process could have been operating, in which personnel who joined the military in the late 1980s and early 1990s were less inclined to use illicit drugs or smoke cigarettes. As noted above, rates of illicit drug use and cigarette smoking have also been declining in the civilian population from which the military population is drawn. Thus, although declines in illicit drug use and cigarette smoking might be attributable, in part, to effective substance use and health promotion programs, they may also result from differences in the characteristics, attitudes, and values of the military populations being surveyed, and from broader social changes.

Summary

In summary, although findings from the Worldwide Survey series cannot be used directly to evaluate the effectiveness of military programs and policies, they do indicate steady and notable reductions in alcohol consumption, illicit drug use, and cigarette use, but less of a decline in heavy drinking. Indeed, in 1992 use of illicit drugs and cigarettes and overall consumption of alcohol were at their lowest levels since 1980.

Despite notable progress, however, there is still room for considerable improvement in some areas. Cigarette smoking remained common in 1992, affecting about one in every three military personnel and was even more prevalent among personnel with only a high school education and among junior enlisted personnel. Thus, the military will need to continue or intensify antismoking efforts to reduce the prevalence of smoking to no more than 20 percent by the year 2000. In addition, the rate of heavy drinking—the consumption level most likely to result in alcohol-related problems—affected about one in seven active-duty personnel in 1992. Moreover, about one in four were heavy drinkers among certain demographic subgroups, such as personnel who were aged 20 and under, unmarried, and in junior enlisted pay grades. Further reductions of smoking and heavy drinking remain the major substance use challenges for the military in the 1990s.

Notes

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AUTHORS' UPDATE: On 7 March 1994, the DoD issued Instruction no. 1010.15 mandating a smoke-free workplace. Under this instruction, smoking is now banned indoors in all DoD workplaces. Policy regarding smoking in clubs, eating facilities, and on-base living facilities is still governed by DoD Directive No. 1010.10, which permits smoking areas to be designated if adequate space is available for nonsmokers, and ventilation is adequate.

Military Life

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Women in the Armed Forces

by

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Foreign Affairs and National Defense Division

SUMMARY

Women have become an integral part of the armed forces, but they are excluded from most combat jobs. Several issues remain for decision. One is whether to reduce, maintain, or expand the number of women in the services as the total forces are being reduced. Difficulties in obtaining enough qualified males led to increasing recruitment of women during the 1970s and 1980s, and women now comprise more than 12% of the armed forces. The percentages vary among the services from less than 5% for the Marines to 15% for the Air Force. A planned reduction of armed forces, in response to a changing world situation and budget pressures, and the availability of enough qualified males, could change the perception of need for military women.

A second question is to what extent women should continue to be excluded from some combat positions by policy. Women are not assigned to certain jobs including many that form the core of defense in actual battle, such as the infantry. All legal barriers have been removed. In 1991, Congress in P.L. 102-190 repealed the law prohibiting women serving on combat aircraft in the Air Force and Navy. In 1993, Congress in P.L. 103-160 repealed the law barring women from Navy combat ships. Policy on assignment of women to combat was left to the Air Force and Navy, as it already was to the Army, which excludes women from combat jobs. Congress in P.L. 103-160 also required advance notice

of changes in policies to open or close assignment of women to combat units, indicating its intent to monitor policy on this issue.

U.S. military actions in Grenada, Libya, the Persian Gulf, and Panama revealed numerous inconsistencies in policy among the different branches and practical problems in having a growing number of persons in the armed forces prohibited from combat posts but representing a substantial part of the forces and serving in combat support units. The deployment of approximately 40,000 women to Saudi Arabia provided the most extensive experience to date.

Some observers contend that additional military jobs could be opened to women. Others contend that adding more women to non-combat posts reduces the number of rotation slots available for men in combat units. In either event, since the main mission of the armed forces is to deter war by being prepared to wage one if it occurs, there is a limit to the extent to which the armed forces can increase the number and expand the assignments of women as long as there are restrictions on assigning women to combat posts.

The two basic considerations involve national security and the role of women in American society. Would national security be jeopardized or enhanced by increasing reliance on women in the armed forces? Should women have equal opportunities and responsibilities in national defense? Or

do role and physical differences between the sexes, the protection of future generations, and other social norms require limiting the

assignments of women in the armed forces? Opinion in the United States is deeply divided on the fundamental issues involved.

MOST RECENT DEVELOPMENTS

In February 1995, Secretary of the Navy John Dalton updated Navy policy concerning pregnancy aboard ships. These new guidelines state that pregnancy is compatible with Navy life and that it cannot be used to shirk sea duty. In addition, any woman who is transferred from ship to shore as a result of pregnancy is expected to be returned to the ship or to an equivalent billet.

BACKGROUND AND ANALYSIS

Two major factors led to the expansion of the role of women in the armed forces. First, after the end of the draft and the beginning of the All-Volunteer Force in December 1973, the military services had difficulty in recruiting and retaining enough qualified males, thereby turning attention to recruiting women. Women were recruited in increasing numbers and assigned to a wider variety of occupations as one method of meeting shortfalls in enlistments by qualified men.

Second, the movement for equal rights for women led to demands for equal opportunity in all fields, including national defense, and a gradual removal of restrictions against them. The Armed Forces Integration Act of 1948 (62 Stat. 356-75) had given women a permanent place in the military services by authorizing women in the regular Army, Navy, Air Force, and Marine Corps. However, it had limited the number of enlisted women to 2% of enlisted strength, the number of female officers (excluding nurses) to 10% of enlisted female strength, and the rank a female officer could achieve to Lieutenant Colonel (or Commander in the Navy).

During the 1960s and 1970s, the movement for equal opportunity for women gave new momentum to efforts to eliminate discriminatory treatment of women in the armed forces. Changes were brought about by policy directives from the services, court decisions, and legislation. In 1967, P.L. 90-130 repealed the limitation of 2% for female enlisted strength. In 1974, the age requirement for enlistment of women without parental consent was made the same as for men (P.L. 93-920). In 1976, women were admitted to the three major service academies: Military, Naval, and Air Force (P.L. 94-106); women had already been admitted to the U.S. Coast Guard and Merchant Marine Academies by administrative action.

In 1978, P.L. 95-485 modified Section 6015 of Title 10 of the U.S. Code, which had precluded women from serving on Navy ships, to permit women to be assigned to permanent duty on vessels not expected to be assigned combat missions, and up to 6 months of temporary duty on other Navy ships. In 1991, the Defense Authorization Act for FY1992 and FY1993 repealed the limitations on assignment of females to combat aircraft in both the Air Force and Navy. Congress in the Defense Authorization Act for FY1994 repealed the last ban, the ban on women in combat ships.

Current Status

Women have become an integral part of the U.S. armed forces. The percentage of women in the armed forces steadily increased from less than 2% at the end of FY1972

to 12% at the end of December 1993, although the total number decreased from 210,048 in FY1992 to 201,263 in FY1993 as part of a general reduction in military force levels. The percentages of women vary among services: Army, 12.6% (71,399); Navy, 11.3% (55,928); Marines, 4.3% (7,656); Air Force, 15.1% (66,280). (See tables at end, Active Duty Enlisted and Officer End Strengths.) Also, the number of career fields and military jobs open to women has steadily increased.

Women have not achieved the equal status that some would like. In addition to remaining a minority, the percentage of women in the higher officer and enlisted ranks continues to be lower than the percentage of women in service. (See table at end, Distribution of Active Duty Women By Rank and Percentage of Total Personnel in Each Rank.) The disparity is much greater if medical officers, which includes nurses, were excluded. The Department of Defense has explained that the clustering of women in the middle to lower officer grades is a reflection of women entering in the lower ranks in large numbers beginning in 1972, and that with time the distribution of women officers should begin to approximate that of men. However, as long as combat jobs are closed to women, there is likely to be a lower proportion of women in the senior officer grades, as these tend to be filled by officers whose careers have been involved in the central mission of the armed forces, which is combat.

A primary barrier to the expansion of the number of women in the services has been that women are not allowed in most combat jobs and many combat-related jobs. Under Defense Department policy, they have been excluded from many other combat-related assignments and occupational specialties. In 1988 the General Accounting Office (GAO) reported that about half of the then 2.2 million active duty military positions were open to women and half were closed. The GAO concluded that "the services limit the number of jobs that women may hold beyond the requirements of the combat exclusion and related program needs. As a result women may not compete for all jobs identified by the services as unrestricted by the combat exclusion or their program needs." Some of this exclusion is related to the alleged need to maintain a rotation base for personnel returning from sea or overseas duty.

In February 1988, the Defense Department adopted a "risk rule" that excludes women from non-combat units or missions if the risks of exposure to direct combat, hostile fire, or capture are equal to or greater than the risk in the combat units they support. It permitted women to be assigned to noncombat units or positions if the risk is less than comparable to the combat units with which they are associated. In September 1988, the Secretary of Defense said that to protect combat readiness, decisions of the Military Departments to assign women to certain units must be made with the understanding that they would be so assigned in times of peace and conflict. He clarified that military women should not be assigned to duties they would not be allowed to fulfill in an emergency, since there would be no plans to evacuate them.

On Jan. 14, 1994, Secretary Aspin announced that the risk rule would be lifted in October 1994. The new rule would be replaced by the following three criteria of direct ground combat, all of which would have to be met to exclude jobs from women: "Women may not serve in units that engage an enemy on the ground with weapons, are exposed to hostile fire, and have a high probability of direct physical contact with the personnel of a hostile force." On July 29, 1994, Secretary of Defense William Perry announced the service would open more than 80,000 additional positions to women,



effective Oct. 1, 1994, after which date more than 92% of the career fields and 80% of the total jobs would be open to women.

In the past, exact policies on combat-related assignments have varied from service to service. The Army, Navy, and Marines all set separate recruiting goals for men and women based on program needs; the Air Force did not. Secretary Aspin established an implementation committee to ensure that policy on the assignment of women was applied consistently across the services, including the reserves.

- **Air Force:** The Air Force has, for several years, had a higher percentage of women than the other services primarily because a small percentage of Air Force personnel serve in direct combat positions. The Defense Authorization Act of 1989 prohibited the Air Force from setting a minimum or maximum percentage of persons according to gender for original enlistments for skill categories or in any other way basing acceptance of a person on gender, except for enlistments for training for duty assignments prohibited by the combat exclusion. A legal ban on women in combat aircraft was removed in December 1991 by P.L. 102-190. On Apr. 28, 1993, Secretary Aspin lifted the policy ban on women in combat aircraft slots, and women began fighter training. On May 27, 1993, the Air Force reported it had opened all aircraft assignments to women. By June 1994, the Defense Department said, 99% of Air Force duty positions were open to women. On Feb. 15, 1994, Air Force Chief of Staff Merrill McPeak presented Lt. Jeannie Flynn, who had just completed training on the F-15E Eagle fighter-bomber, as the first Air Force female combat pilot.
- **Army:** With Secretary Perry's approval of a plan effective to open more jobs to women, effective Oct. 1, 1994, the Army expected to open approximately 32,700 positions to women in the active and reserve forces. The number of Army career fields open to women would rise from 61% to 91%. On May 28, the Army reported it had opened over 9,000 positions in attack helicopter units to women, and three women aviators were being assigned to attack aviation units. Special Operations Forces aircraft units and some air cavalry units remained closed to women because they deploy with closed ground combat units. On June 1, 1994, Secretary of the Army Togo West, in a memorandum published in *Inside the Army*, recommended assigning women to Multiple Launch Rocket System (MLRS) units, Special Operations Forces aircraft, air cavalry troop and support, and several other MOSs that have been closed to women. After vigorous objections from Army generals, a compromise was worked out in which 32,000 new combat posts will be opened. Women are still barred from some career fields including Armor, Infantry, Special Forces, Cannon Field Artillery, Multiple Launch Rocket Artillery, and Forward Area Air Defense Artillery. On Nov. 22, 1994, a company at Ft. Leonard Wood was the first group to complete coed basic training under a new policy of gender-integrated basic training for many noncombat jobs.
- **Navy:** In Section 541 of the Defense Authorization Act for FY1994, P.L. 103-160, Congress repealed the law, 10 U.S.C. 6015, prohibiting women from serving on combat vessels. On Mar. 7, 1994, the Navy issued its first orders for women to take up assignments aboard a combat ship, the aircraft carrier USS Eisenhower. Navy Secretary John H. Dalton plans to assign between 400 and 600 women to the aircraft carrier and to other combat ships later in the year. Navy has also opened pilot training and assigned women to various ship types

in the combat logistics force. Closed jobs include those specifically associated with submarines, such as submarine sonar technician or gun or missile crew member. Reserving some positions to permit ship-to-shore rotations also limits the number of women. As of Oct. 1, 1994, 94% of the jobs and 96% of the Navy career fields were to be open to women. On May 3, 1994, Chief of Naval Operations Jeremy Boorda said he wanted to recruit more women into the Navy and that the goal was to allow women on all ships. Navy Secretary John Dalton has directed that the issue be reexamined annually, with the next report due in April 1995. On Oct. 25, 1994, a Navy female combat pilot, Lt. Kara S. Hultgreet died landing an F-14 fighter on the deck of the *USS Abraham Lincoln*.

- **Marines:** The Marine Corps, which plans to expand the number of women to 10,493 in the next two decades, have the smallest percentage of women largely because a higher proportion of Marines than members of the other services are serving in combat roles. As of Oct. 1, 1994, 48,000 new positions were to be open to women, including assignments on combatant vessels and Marine Corps Air/Ground Task Force (MAGTF) Headquarters and Air Defense Artillery Battalion Headquarters. The career fields open to women would rise from 33% to 93%. Women already serve as Marine Security Guards for U.S. Embassies overseas and may serve as Hawk Missile technicians and operators. Examples of jobs closed to women are combat engineers, infantry, and tanks. All pilot positions remained closed to women at the end of 1992, but after Secretary Aspin's announcement of Apr. 28, 1993, the Marine Commandant said women would in the future compete for aviation slots on a gender-neutral basis.

Military Women in Combat Actions Abroad

Considerable experience has been gained in recent years with the deployment of women in the armed forces to military actions abroad. According to the Department of Defense, 1,228 females are now stationed in Haiti. Women were included in actions in Grenada in October 1983, Libya in 1986, the Persian Gulf in 1987, and Panama in December 1989. More than a thousand women troops were stationed in Somalia during the operation there from December 1992 to 1994. The largest deployment was to Saudi Arabia and the Persian Gulf in 1990 and 1991, Operation Desert Storm, so it is discussed here to illustrate both the progress women have made in the military services and the policy dilemmas.

Women were included in the forces sent to Saudi Arabia and the Persian Gulf soon after the U.S. deployments to halt Iraqi aggression against Kuwait began on Aug. 8, 1990. From that time and throughout the hostilities that started Jan. 16, 1991, they served both in traditional roles such as nurses and non-traditional roles such as aircraft ground crews, intelligence, and communications specialists. According to the Defense Department, 7% of the service personnel in the area were women. This is less than the 11% that women comprise of the forces as a whole because of the exclusion of women from specified combat units, and because services with a smaller percentage of women -- the Marines, Navy, and Army -- were overrepresented; and the service with the largest percentage of women -- the Air Force -- was underrepresented, compared to their overall percentage of the armed forces. Women comprised 22% of the enlisted medical and dental specialists and 19% of the enlisted personnel in functional support and

administration. Following is the Defense Department breakdown by service of the total number of women deployed during Operation Desert Storm, as of July 11, 1991.

Women Deployed during Operation Desert Storm

Branch of Service	Active Duty	Reserves	Total
Army	19,590	11,265	30,855
Navy	3,400	1,049	4,449
Marines	1,098	134	1,232
Air Force	2,978	1,268	4,246
Total	27,066	13,716	40,782

Operation Desert Storm showed that women could satisfactorily perform many jobs traditionally held by men and that they could be in danger even if restricted from combat posts. The action also called into question the belief that the American public would be unable to accept female casualties or the idea of female prisoners of war. Casualties among female military personnel, which included 13 deaths and two prisoners of war, appeared to be viewed in the same spirit among the American people as casualties among males. A GAO study of July 1993 found that health and hygiene problems were minor for both men and women and had no negative effects on mission accomplishments. But Operation Desert Storm also dramatized there were broad social issues involved as mothers, as well as fathers, were separated from their children for long periods during the deployment. Moreover, one of the female prisoners of war testified that she had been sexually abused by an Iraqi guard. In addition, the *Army Times* revealed that at least 24 U.S. Army servicewomen had been raped or sexually assaulted while serving in the Persian Gulf region.



Should the Armed Forces Expand Recruitment of Women?

One issue is whether to expand the number of women in the armed forces. As the total size of forces decreases, an increase in the number of women would rapidly increase the percentage of women. The question of whether the percentages should be increased or decreased could become more acute during the 1990s as active duty military personnel strengths decline greatly, and the military services can meet their recruiting requirements with men as qualified as any women applicants. Thus far, the proportion of women has been increasing even while the total force number declined. From 1989 until 1993, the active duty female strength declined from 232,823 to 201,263, but the proportion of women increased from 10.9% to 12%.

At issue are the qualifications needed for modern armed forces, whether women meet these qualifications, the effect more women in the services would have on the ability of the armed forces to carry out their missions, and the effect on society.

One qualification is education, which some believe is becoming more important with the growing complexity of modern weapons systems. The services have been able to achieve higher standards for women recruits than for men because of the small recruitment levels for women. A principal argument in favor of increasing the numbers

of women in the armed forces has been that it would be better to raise the number of women recruits who are better educated than to recruit less educated men. If the number of women recruits is increased, however, and the male recruiting requirements decline, the differences in education level between male and female recruits might be expected to narrow. Moreover, some argue that while educational credentials may indicate a recruit's likelihood of completing an enlistment term, they are not necessarily an indicator of ability to perform a military mission.

Another qualification is aptitude for the needed jobs. In aptitude tests given by the Army, men as a group have consistently scored higher than women as a group in three areas: electronics, general mechanics, and motor mechanics. Men and women have scored roughly the same in the general technical and clerical composites, with women scoring slightly higher in the clerical. Some contend that these differences might be expected as a result of differences in the educational and cultural backgrounds of men and women, and that the tests do not reliably predict the performance of properly trained women in fields such as electronics and mechanics. Others note that the issue is not one of the origins of aptitude differences, but the assignments of individuals to the military position for which they are best suited, and that aptitude tests correlate interest, ability, and speed in learning skills.

A related question is the kind of jobs to which women should be assigned. Should jobs be assigned on the basis of aptitude testing without regard to gender, or should special effort be made to train women for jobs in the traditionally non-female occupations even if they do not initially have high aptitudes in these fields? Most women have traditionally been assigned to the administrative and medical occupations in which their aptitudes and preferences are higher. Some favor continuing this policy since most women prefer these jobs and there is room for more women in these areas. Studies by the Department of Defense have shown that enlisted women have much higher rates of retention in the service when they are assigned jobs in the traditionally female skills (administrative and clerical, and medical and dental) and lower retention rates in traditionally non-female occupations (mechanical and electrical equipment repair.) Other observers believe that assigning women in the whole range of military jobs is required for equal opportunity in the military services and, with proper training, women will demonstrate they are capable of performing most military jobs.

A third area of qualifications at issue involves the entire range of physiological differences between men and women. One aspect is physical size and strength. The average female recruit has from 50%-70% of the strength, stamina, and muscle mass of the average male recruit with the greatest disparity existing in the female's upper body strength. Since the major physical capacity requirements for many military jobs are deemed to be lifting and carrying, upper body strength is a limiting factor for women in these jobs. The Army has developed criteria for determining whether individuals could meet the strength requirements for each job, but some women question whether the physical strength requirements being placed on many jobs by the Army are as important as other criteria, such as education, in which women are not at a disadvantage. Others express fear that the military services are lowering their physical strength requirements to accommodate women. Section 543 of the Defense Authorization Act for FY1994 required that for any military occupational specialty for which the Secretary of Defense determines certain physical qualifications are demanded, the Secretary must prescribe specific physical requirements and apply the requirements on a gender-neutral basis. It also required notice to Congress when changes in

occupational standards are expected to result in an increase or decrease of at least 10% in the number of females assigned to that occupational field.

Another aspect of the physiological differences involves pregnancy and childbirth. There is concern that because of these uniquely female conditions, and the related traditional responsibility of mothers for childcare, women will lose more time away from duty, be less able to deploy rapidly, and have shorter service careers. With more women, the services are likely to be faced with an increasing number of persons who have sole or primary responsibility for children or dual military couples in which both parents are in the military. Some believe that the military services could meet this challenge by providing adequate child care facilities. Others argue that assuming responsibility for childcare would be too costly and is not a part of the defense mission.

Some look beyond individual qualifications to group performance and contend that even if they meet all necessary qualifications and can perform the necessary tasks, women will decrease the efficiency and effectiveness of the armed forces. In their view, having women in large numbers might impair the morale and efficiency of men who have taken pride in the masculinity of their profession. According to reports, a U.S. Army Research Institute conducting unit cohesions tests in 1993 found that cohesion levels were best in all-male units, lower in integrated units, and the lowest in an all-female company. Critics contend that the United States already has a greater percentage of women in its armed forces than almost all other countries and view this as a weakness.

Should Women Be Barred from Combat Positions?

Since the main mission of the armed forces is to deter war by being prepared to wage one if it occurs, there is a limit to the extent to which the armed forces can increase the number and expand the assignments of women as long as there are restrictions on assigning women to combat posts. Operation Desert Storm brought new attention to the subject, and the Defense Authorization Act for FY1992 and FY1993 (P.L. 102-190) and for FY1994 (P.L. 103-160) repealed the legislated limitations on assignment of females to combat aircraft and ships. It is now up to each service Secretary to set policy and assign personnel according to needs and abilities. Currently, women are still barred from many combat positions by service policies. Secretary Aspin asked the services to reconsider the exclusion of women from other combat jobs outside of front-line infantry and armor units, and on Jan. 13, 1994, announced new rules that would allow women in more combat support roles but continue to bar women from direct ground combat units.

Section 542 of P.L. 103-160 requires 30-days' advance notice to the Armed Services Committees of Congress before implementing personnel policy changes made to allow women to be assigned to any type of combat unit or class of combat vessel that was not already open to women. Section 542 also requires 90-days' notice before making any changes to the ground combat exclusion policy, including any changes in categories of units or positions open to women.

The services are in a period of revising and adjusting their policies. On July 29, 1994, Secretary of Defense Perry announced plans to open additional jobs to women as a result of the rescinding of the previous Risk Rule effective Oct. 1, 1994. Secretary

Aspin had announced the rescinding in a memorandum of Jan. 13, 1994, along with the following new direct ground combat rule and definition:

A. Rule. Service members are eligible to be assigned to all positions for which they are qualified, except that women shall be excluded from assignment to units below the brigade level whose primary mission is to engage in direct combat on the ground, as defined below.

B. Definition. Direct ground combat is engaging an enemy on the ground with individual or crew served weapons, while being exposed to hostile fire and to a high probability of direct physical contact with the hostile force's personnel. Direct ground combat takes place well forward on the battlefield while locating and closing with the enemy to defeat them by fire, maneuver, or shock effect.



Those who emphasize equal rights and responsibilities say women in the armed forces cannot advance to the top without combat experience. Some carry the argument further to say that women cannot be equal in society as long as they are barred from full participation in all levels of the national security system. In their view, modern weapons have equalized the potential for women in combat, since wars are less likely to be fought on a hand-to-hand basis, and have made it impossible to protect women from the destructiveness of combat; in any event, properly trained women would be able to fight successfully and exempting them from combat is not fair to men.

Those opposed to women in combat contend that national security would be jeopardized because women are not as strong or aggressive as men and their presence would impair the individual and group effectiveness of men. This view holds that the protection of women is a mark of civilization, that in battle men would be diverted from their mission by trying to protect women, and that cohesion would be jeopardized by male-female relationships and sexual rivalry among men. They disagree with the assumption that modern technology has significantly reduced the direct physical nature of combat, especially ground combat. They see permitting women in combat as an extreme, unproven deviation from tradition based on the political views of a few. They point out that countries such as Israel and Russia, in which women have fought in emergencies, do not now place women in combat positions.

Since women themselves are divided on the issue, one option is to permit women who meet the criteria to be assigned to combat positions, but not unless they volunteer for such assignments. Some women believe this would provide equal opportunity for those who want it while respecting the views of those who see a different role for women. Critics contend that it would be unfair to permit women a choice that is not available to men, and that to make the choice available to both men and women would make it difficult for the services to function, especially in the event of war.

Other NATO nations that allow women in combat jobs include Belgium, Britain, Canada, Denmark, Greece, the Netherlands, and Norway. The French Defense Ministry announced in September 1992 that the French Navy would regularly assign up to 500 women to duty in ships by 1998 and that the only duty denied women would be in submarines, the French marines, and as pilots of naval fighter aircraft.

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WOMEN...CONTINUED

Commission on the Assignment of Women in the Armed Forces

The Defense Authorization Act passed in 1991 (P.L. 102-190, Section 521) established a 15-member Commission on the Assignment of Women in the Armed Forces to study and make recommendations on issues related to assigning women to combat positions. On Mar. 10, 1992, the President appointed 6 women and 9 men to the Commission and named retired Air Force General Robert T. Herres as Chairman. The Commission reported to President Bush on Nov. 15, 1992. Because of division among Commission members, the report resolved few major issues, although it provided a large body of information and views. President Bush submitted the report to Congress without comment on Dec. 15, 1992, leaving decisions to the Clinton Administration.

The Commission recommended by a vote of 8-7 that Defense Department and service policies prohibiting women in aircraft on combat missions should be retained and that the corresponding legal prohibition, repealed in 1991, should be reenacted. It voted 8-6 to repeal existing laws and modify service policies for women to serve on combat vessels except submarines and amphibious vessels. It voted 9-6 that Defense should establish a policy to ensure that no person who is best qualified be denied access on the basis of gender to an assignment open to both men and women. Votes on other recommendations included the following:

- Women should be excluded from direct land combat units and positions, and existing service policies concerning such exclusions should be codified (10-0).
- Military readiness should be the driving concern on assignment policies; in some circumstances women might be assigned to combat (8-1).
- Services should adopt gender-neutral assignment policies (10-3).
- Entry-level training may be gender-specific (8-6), and military pre-commissioning training may be gender-normed (10-4).
- Services should retain gender-specific physical fitness tests and standards, provided they do not compromise training for physically-demanding combat or combat support jobs (12-0).
- Services should adopt gender-neutral muscular strength and endurance requirements for those specialties for which they are relevant (14-0).
- Defense Department should review and adopt new policies, or better implement current ones, to reflect concerns about family and child issues, with recommendations for specific alternatives to consider (9-0).
- Defense Department should review rules regarding pregnancy to ensure consistency and force readiness (8-0).
- All family care plans must be regularly reviewed by local commanding officers, and failure to ensure full compliance with family care requirements may constitute grounds for disciplinary action (15-0).
- Women should not be required to register for, or be subject to, conscription (11-3).

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What Provisions for Motherhood?

Secretary of Defense Aspin also asked the implementation committee he established on Apr. 28, 1993, to review the services' parent and family, and pregnancy and deployability policies, in connection with his emphasis on opening more assignments to women and maintaining readiness and effectiveness.

Some opponents of women in combat believe a major issue is the role of women in society as mothers and that keeping them out of combat is a method of safeguarding the human race. Proponents of allowing women in combat agree that safeguarding infants and children is essential, but they believe this can be achieved through flexible deployment policies and adequate childcare arrangements. Another view is that women in the military make up such a small proportion of the population that the impact of on society of allowing mothers in combat would be slight, so the issue should be based on the impact on operational effectiveness of the armed forces.

Both men and women may have the primary responsibility for young children who would have to be left behind if they were deployed in combat and orphaned if they were killed. The potentially harmful effect on children was perhaps the principal issue raised by the deployment of women to the Persian Gulf. Many hardship stories were published concerning single parents or military couples sent to Saudi Arabia, leaving their children in the care of relatives, neighbors, or whomever they could find. Defense Department figures indicated that on Feb. 13, 1991, 16,337 single parents and 1,231 military couples with children were deployed in Operation Desert Shield. Thus, in all 17,500 families, children were separated from their parents by the war.

On Feb. 7, 1991, Secretary of Defense Cheney and Chairman of the Joint Chiefs of Staff Colin Powell wrote:

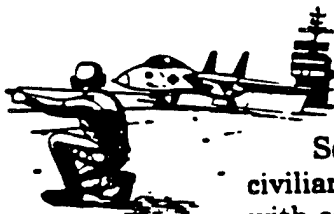
Years ago, the Department of Defense made the considered policy choice not to treat single parents and military couples as second class citizens, and to allow them to serve anywhere in the world, in every type of unit, and in any position.... We have had a long-standing policy of requiring every single parent and military couple to maintain a current family care plan to ensure that their children are cared for when the parent or parents deploy.

According to the Defense Department, in the total Armed Forces, there are 91,000 single, active duty personnel who have dependents who are children, primarily a designation so the dependent may receive benefits. The Defense Department estimates there are 66,000 single parents who have custody. Of these 39,400 are males and 26,600 are females; thus, there are more male single parents but a larger percentage of active duty women are single parents. According to the Defense survey, there are 70,000 dual military career couples. Of these, 40,400 active duty couples have children, and 6,600 active duty personnel married to reservists have children. The Services seek to assign military couples to the same post to the extent possible and ordinarily couples would favor this policy, but the war in the Persian Gulf presented a new situation.

In connection with the war, some Members of Congress sought to bring about policy changes, and Congress directed the Secretary of Defense to study the policies on deployment as they affected family responsibilities and to report to the Armed Services Committees by Mar. 31, 1992. (Section 315, the Persian Gulf Conflict Supplemental

Authorization and Personnel Benefits Act of 1991, P.L. 102-25). The House also stated its sense that the armed services should strive for a uniform policy with respect to the deployment of mothers of newborn children, and that to the maximum extent possible such policy should provide that mothers of newborn children under the age of 6 months should not be deployed (Section 317, P.L. 102-25.) On Aug. 21, 1991, the Defense Department directed that military mothers should be deferred from assignments necessitating separation for 4 months after the birth of a child.

In February 1995, Secretary of the Navy John Dalton updated Navy policy concerning pregnancy aboard ships. These new guidelines state that pregnancy is compatible with Navy life and that it cannot be used to shirk sea duty. In addition, any woman who is transferred from ship to shore as a result of pregnancy is expected to be returned to the ship or to an equivalent billet.



Sexual Harassment

Sexual harassment has been a recurrent issue for women in the military, as in civilian occupations. As in other occupations, a main issue is how to prevent and deal with sexual harassment. Some observers believe sexual harassment may be a bigger problem for women in the military, however, because of the traditionally male environment and the smaller proportion of women than in many occupations. In addition, the issue could affect perceptions relating to the role of women in the military and in combat. Those who endorse a larger role for women in the military may view sexual harassment as a hurdle that can be overcome by proper policy and training. Those opposed to women in the military may view sexual harassment as a danger to women and a reason for keeping their military role limited.

In addition to problems during Operation Desert Storm discussed above, a recent incident bringing attention to the subject was a convention of the Tailhook Association, a private group of retired and active-duty Navy and Marine Corp aviators, in Las Vegas in September 1991. Approximately 25 women, 13 of them naval officers, reportedly were forced to run a gantlet of men and encountered various assaults. The Navy's initial investigation of the incident was criticized as slow and ineffective, and the Navy turned the investigation over to the Defense Department's Inspector General. On June 26, 1992, Navy Secretary H. Lawrence Garrett 3d resigned his post, saying he accepted full responsibility for the handling of the incident. P.L. 102-638, the supplemental appropriations act signed Sept. 23, 1992, provided an additional \$3,400,000 for the Department of Defense Inspector General to expedite the investigation. A report issued Sept. 24, 1992, by Deputy Inspector General Derek J. Vander Shaaf said senior Navy officials had undermined their own investigation to avoid negative publicity, and some officers were reassigned to other duties or forced to retire. The final report, issued Apr. 23, 1993, described the situation as "the culmination of a long-term failure of leadership" and recommended disciplinary action against approximately 140 Navy and Marine officers. On Oct. 15, 1993, the Pentagon announced that Navy Secretary John H. Dalton had ordered one retired Navy admiral reduced in rank and had censured two others for failing to prevent the Tailhook incidents, and had ordered non-punitive administrative actions against 30 other admirals. Administrative penalties were levied in approximately 50 of 140 cases stemming from Tailhook.

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WOMEN...CONTINUED

On Feb. 8, 1994, military judge Captain William T. Vest Jr. held that Chief of Naval Operations Admiral Frank B. Kelso had manipulated the investigation to shield his involvement, and the court dismissed charges against three Navy officers. (For decision, see *Congressional Record*, Feb. 10, 1994, p. H460.) On Feb. 10, 1994, the Navy decided not to appeal the dismissal of the last three cases arising from the Tailhook incident. Representative Patricia Schroeder called on the Secretary of Defense to act because no one had been held accountable for the incident. On Feb. 15, 1994, Admiral Kelso announced he would retire two months ahead of schedule. The Senate on April 19 voted to approve Kelso's retirement as a four-star admiral by a vote of 54 to 43; all seven women Senators voted in opposition.

After the Tailhook incident, the Navy established a Standing Committee on Women to assess policies on sexual harassment, and all Navy and Marine personnel were required to complete a 3-hour training course on sexual harassment and Navy policy, which Admiral Jesse Hernandez described as "zero sexual harassment tolerance." The Defense Department and the Defense Advisory Committee on Women in the Services were already monitoring and defining policy on complaints of sexual harassment. On July 20, 1988, the Secretary of Defense issued a memorandum defining sexual harassment and stating Department policy that "sexual harassment is unacceptable conduct and will not be condoned or tolerated in any way." Sexual harassment was defined as "a form of sex discrimination that involves unwelcomed sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when (1) submission to or rejection of such conduct is made either explicitly or implicitly a term or condition of a person's job, pay, or career, or (2) submission to or rejection of such conduct by a person is used as a basis for career or employment decisions affecting that person, or (3) such conduct interferes with an individual's performance or creates an intimidating, hostile, or offensive environment. Any person in a supervisory or command position who uses or condones implicit or explicit sexual behavior to control, influence, or affect the career, pay, or job of a military member or civilian employee is engaging in sexual harassment."

On July 12, 1991, Secretary Cheney issued a memorandum calling for each component of the Defense Department to implement a program to underscore that sexual harassment would not be tolerated. The program was to include annual statements that explain sexual harassment and policy toward it; training programs to teach how to identify and prevent sexual harassment; priority for prompt and thorough investigation and resolution of each complaint; procedures to hold every manager accountable for providing guidance; and informing personnel that failure to comply with the guidelines would be reflected in performance rating and fitness reports and could lead to loss of benefits and imposition of penalties.

Despite these efforts and the Tailhook incident, sexual harassment has continued to be a problem. In November 1994 several male West Point cadets were disciplined for sexual harassment of female cadets, and the Navy was investigating charges of sexual harassment by male instructors at a Naval Training Center. A GAO report of January 1994 found that nearly 97% of military academy women in 1991, and 80% in 1993, reported experiencing some form of sexual harassment, such as sexist or demeaning comments. At hearings on Mar. 9, 1994, four women, representing each of the services, complained that often the services penalized the women who complain of harassment rather than the men who harassed them. On May 12, 1994, Navy Secretary John H. Dalton apologized to Lieutenant Darlene Simmons for her treatment. Subsequently the

approval of Adm. Henry Mauz Jr.'s retirement at his current rank became controversial after five female Senators complained that he had not acted quickly enough to protect Lt. Simmons against retribution; on Sept. 20, 1994, the Senate agreed by a vote of 92-6 to his retirement at the current rank.

Sections 531 and 532 of the National Defense Authorization Act for FY1995, P.L. 103-337, concerned sexual harassment. Section 531 establishes machinery for the prohibition of retaliatory actions against members of the armed forces making allegations of sexual harassment or unlawful discrimination. Section 532 requires the Department of Defense Task Force on Discrimination and Sexual Harassment to submit its report by Oct. 1, 1994, to be submitted to Congress by Oct. 10, 1994. It calls for the Secretary of Defense to establish a comprehensive policy for processing complaints of sexual harassment and discrimination.

Authorization and Appropriations Laws: 103rd Congress

P.L. 103-160, H.R. 2401/S. 1298; National Defense Authorization Act for Fiscal Year 1994. Section 541 repeals Section 6015 of 10 U.S.C., which prohibits the permanent assignment of women in the Navy and Marine Corps (except for aviation officers) to vessels engaged in combat missions. Section 542 calls for establishment of gender-neutral occupational performance standards. Section 543 requires the Secretary of Defense to report to Congress 90 days before implementing any change affecting the policy restricting assignment of women in units whose mission requires routine engagement in ground combat. Section 701 adds a new section 1074d to Chapter 55 of 10 U.S.C. on primary and preventive health care services for women. Section 735 requires the Secretary of Defense to submit a report to Congress by Oct. 1, 1994, evaluating the provision of health care services to women. H.R. 2401 introduced June 14, 1993; referred to Committee on Armed Services. Reported to House (H.Rept. 103-200) July 30, 1993. Passed House Sept. 29, 1993. S. 1298 introduced July 27, 1993; referred to Committee on Armed Services. Reported to Senate (S.Rept. 103-112) same day. Passed Senate, amended, Sept. 14, 1993. Amended text incorporated in H.R. 2401 (as passed Senate) and passed in lieu, Oct. 6, 1993. Conference report (H.Rept. 103-357) agreed to in House Nov. 15, 1993; agreed to in Senate Nov. 17, 1993. Signed into law Nov. 30, 1993.

P.L. 103-337, S. 2182/H.R. 4301; National Defense Authorization Act for FY1995. H.R. 4301 passed House, amended, June 9, 1994. S. 2182 reported by Armed Services Committee (S.Rept. 103-282) June 14, 1994. Committee recommended an additional \$5 million for ship alterations to facilitate assigning women to sea duty billets. Passed Senate July 1, 1994. Conference report filed Aug. 12, 1994 (H.Rept. 103-701). House agreed to conference report Aug. 17, 1994, and Senate agreed on Sept. 13, 1994. Signed into law Oct. 5, 1994. Section 241 continues and authorizes \$40 million for Defense Women's Health Research Program established by P.L. 103-160. Section 531 concerns prohibition of retaliatory actions against members of the armed forces making allegations of sexual harassment or unlawful discrimination. Section 532 concerns Defense Department policies on discrimination and sexual harassment.

SEE CHARTS NEXT TWO PAGES

Active Duty End Strengths

FY	ARMY	%	NAVY	%	USMC	%	USAF	%	TOTAL	%
Enlisted Women										
1964*	7,958	.9	5,063	.9	1,320	.8	4,845	.7	19,186	.8
1969**	10,721	.8	5,752	.8	2,443	.9	7,407	1.0	26,323	.9
1972	12,349	1.8	6,257	1.2	2,066	1.2	11,725	2.0	32,397	1.6
1973***	16,457	2.4	19,174	1.9	1,973	1.1	15,023	2.6	42,627	2.2
1974	26,327	3.9	13,381	2.8	2,402	1.4	19,465	3.7	61,575	3.3
1975	37,701	5.6	17,516	3.8	2,841	1.6	25,232	5.0	83,272	4.6
1976	43,806	6.5	19,288	4.2	3,063	1.8	29,235	6.1	95,392	5.3
1977	46,094	6.8	19,464	4.4	3,506	2.0	34,610	7.3	103,674	5.8
1978	50,549	7.6	21,093	4.1	4,652	2.4	41,084	8.8	117,597	6.6
1980	61,968	9.3	30,955	6.7	6,269	3.7	52,205	11.4	151,397	8.6
1982	63,622	9.4	37,321	7.7	7,875	4.5	54,506	11.3	163,324	9.0
1986	69,151	10.4	46,796	9.3	9,246	5.2	60,694	12.3	185,887	10.1
1989	73,794	11.2	51,633	10.0	9,012	5.1	63,175	13.6	197,614	10.9
1991	67,268	11.2	50,961	10.3	8,320	4.8	58,585	14.3	185,134	11.0
1992	61,202	12.0	50,513	10.8	7,875	4.8	55,598	14.8	175,188	11.5
1993(Dec.)	59,893	12.6	47,284	11.1	7,031	4.4	53,572	15.2	167,780	11.9
Officer Women										
1964*	3,772	3.4	2,678	3.5	128	.7	4,031	3.0	10,609	3.1
1969**	5,157	3.0	2,884	3.2	284	1.1	4,858	3.6	13,183	3.1
1972	4,422	3.6	3,185	4.4	263	1.3	4,766	3.9	12,636	3.8
1973***	4,279	3.7	3,454	4.9	315	1.6	4,727	4.1	12,775	4.0
1974	4,388	4.1	3,649	5.4	336	1.8	4,767	4.3	13,140	4.3
1975	4,594	4.5	3,676	5.6	345	1.9	4,981	4.7	13,596	4.6
1976	4,844	4.8	3,544	5.6	386	2.0	4,967	5.0	13,741	4.9
1977	5,696	5.8	3,791	6.0	422	2.3	5,383	5.6	15,292	5.5
1978	6,292	6.4	3,980	6.4	433	2.4	6,010	6.3	16,715	6.1
1980	7,528	8.9	5,027	8.3	453	2.7	8,876	9.0	21,884	8.4
1982	9,033	8.8	5,740	8.5	560	3.0	9,942	9.8	25,275	8.7
1986	11,263	10.3	7,260	10.1	643	3.2	12,377	11.4	31,543	10.1
1989	12,197	11.1	7,453	10.3	696	3.5	13,403	12.9	33,749	11.1
1991	12,532	12.1	7,981	11.3	685	3.5	13,323	13.8	34,521	11.9
1992	11,738	12.4	8,294	12.0	649	3.4	12,683	14.0	33,364	12.2
1993(Dec.)	11,013	12.7	8,150	12.5	625	3.4	12,173	14.8	31,961	12.7

Sources: Department of Defense Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics); Washington Headquarters Services. Directorate for Information.

- * Last pre-Vietnam War fiscal year.
- ** Peak of Vietnam War, during draft period.
- *** Beginning of All Volunteer Force.

**Distribution of Active Duty Women
By Rank and Percentage of Total Personnel
December 31, 1993**

	Total		Army		Navy		Marine		Air Force	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Officers										
O-8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
O-7	11	2.3	3	1.8	4	3.4	1	2.9	3	2.0
O-6	546	4.3	198	5.1	163	4.4	8	1.3	177	4.0
O-5	2,649	9.1	925	9.7	826	10.7	37	2.4	861	8.3
O-4	6,267	13.3	1,986	13.1	1,597	12.8	97	3.3	2,587	15.6
O-3	13,216	14.4	4,147	15.6	3,103	13.4	166	3.0	5,800	15.9
O-2	4,395	15.1	1,701	17.3	1,157	14.1	122	3.4	1,415	19.0
O-1	4,115	16.9	1,547	18.1	1,148	16.2	90	4.0	1,330	20.6
Warrant										
W-5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
W-4	27	1.1	17	1.0	4	0.8	6	2.0	0	0.0
W-3	154	3.0	111	3.1	16	1.8	27	4.4	0	0.0
W-2	424	5.5	262	4.7	103	7.7	59	7.8	0	0.0
W-1	157	7.0	116	5.8	29	58.0	12	7.1	0	0.0
Officers Total	31,961	12.7	11,013	12.7	8,150	12.5	625	3.4	12,173	14.8
Enlisted										
E-9	357	2.9	94	2.9	102	2.4	17	1.2	144	4.0
E-8	1,744	5.6	691	5.9	425	4.7	78	2.4	550	7.7
E-7	10,400	8.4	4,344	9.4	2,125	6.7	384	4.3	3,547	9.8
E-6	21,052	10.0	7,413	10.5	6,615	8.9	738	5.2	6,286	12.3
E-5	33,569	11.6	11,455	12.4	10,568	11.4	1,248	5.7	10,298	12.6
E-4	47,352	13.7	18,561	14.1	10,097	11.3	1,607	5.3	17,087	18.1
E-3	28,958	13.5	9,264	14.7	8,333	14.6	1,858	4.0	9,503	20.1
E-2	14,233	13.3	4,254	14.5	5,345	13.4	725	3.7	3,909	21.2
E-1	10,115	13.1	3,817	14.3	3,674	13.5	376	3.2	2,248	19.5
Enlisted Total	167,780	11.9	59,893	12.6	47,284	11.1	7,031	4.4	53,572	15.2
Cadets & Midshipmen	1,522	12.3	493	11.8	494	12.0	NA	NA	535	13.1
Grand Total	201,263	12.0	71,399	12.6	55,928	11.3	7,656	4.3	66,280	15.1

*Percentages may not total 100 due to rounding.

Compiled by the Congressional Research Service from Department of Defense data.

Health Status of Women in the Armed Forces

ANNE HOIBERG AND JACK F. WHITE

Since 1973, a fivefold increase in the number of women in the U.S. military has occurred. At present, the four branches of the military have one of the largest populations of female members in the world—a population of approximately 229,000 officers and enlisted women, which accounts for 10.8 percent of the total force. The percentages of women by branch are as follows: 12.8 percent in the Air Force, 10.9 percent in the Army, 10.5 percent in the Navy, and 4.9 percent in the Marine Corps.

The impetus for the beginning of the increase in women's enlistments was the discontinuation of conscription and the corresponding initiation of the all-volunteer force (AVF), changes that were expected to result in a shortfall of male applicants. With a shrinking pool of eligible, high-quality male applicants interested in serving in the AVF, the number of military women began to increase, which has continued throughout the ensuing years. The need for high-quality individuals, those with at least a high school diploma, is not likely to diminish; each branch is seeking applicants who can be trained to use and maintain technologically sophisticated

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equipment.¹ As a result, the military may have to depend increasingly on women, who have a higher rate of high school graduation than men.²

Not all young men and women in the United States are eligible for active military service. In the process of selecting youths for military service, 22 percent of all young men and women are eliminated because their aptitude scores are lower than the required level or their educational achievements are deficient. Another 15 percent would be expected to fail the physical standards, with excessive weight accounting for the largest proportion of physical disqualifications.³ The Air Force, for example, estimates that 56 percent of men and 46 percent of women are qualified to enlist, individuals who meet the criteria based on physical health, nonuse of drugs, lack of recorded criminal involvement, level of education, and Armed Forces Qualification Test scores.⁴ Because of such eliminations and restrictions, it is presumed that individuals accepted for military service are physically and mentally fit.

The occupations to which women are assigned include all specialties except those directly related to combat. In the Air Force, women serve primarily in such support fields as administrative, medical, dental, and repair specialties. The nonspecificity of these jobs has led Judith Sitem to conclude that "U.S. Air Force enlisted personnel could be mostly women," and that the Air Force could be "given to women."⁵ Specific examples of nontraditional jobs for Air Force women are security specialists and members of Titan II and Minuteman missile crews. Army and Marine Corps women serve in a wide range of occupational specialties from military police to mechanical repairperson although they are excluded from all direct combat positions. After a brief period when women Marines were restricted from security guard duty in high-risk locations, they once again hold the prestigious job of embassy guard. Navy women have been assigned to noncombatant ships since 1978 when the U.S. Congress approved modifications to Section 6015 and President Jimmy Carter signed P.L. 96-485 into law. By the beginning of 1992, the Navy planned to have approximately 600 women officers and almost 9,000 enlisted women assigned to ships.⁶ Navy women serve in such diverse environments as the industrialized ships in the tender and repair classes and the sterile environment of an operating room.

Each environmental setting, whether onboard a ship in the Navy or ashore in the Army, constitutes a unique set of physical agents, toxic hazards, and exposures. Working in one of approximately 100 different occupational specialties introduces additional risks for individuals so assigned, which may adversely affect their health status. Being in the military alone could have a deleterious impact on women's health because of

tress associated with being a minority in a predominantly male organization or with being a victim of sexual harassment. These environmental, occupational, and psychosocial factors, therefore, may contribute to increased risk of ill health among women in the military. The objective of this longitudinal study is to assess the health status of enlisted women in the Navy and to determine whether or not women's illness, injury, and patterns have changed over the 15-year period since the advent of AVF. Comparisons with women's data from other services also will be conducted.

Factors Affecting Women's Health

Historically, one of the most important considerations associated with women's utilization in the military was concern about the impact of active duty on their health. Another centered on women's health problems and possible adverse influence on military readiness. During World War II, for example, gynecological and obstetrical disorders were most frequently cited as the major reasons against the increased use of women.⁷ The sick call rate of Army women for all reasons was reported at 36 percent more than the men's rate in 1943; industrial surveys conducted at the same time indicate that women's medical care visits were twice those of men. The director of the Women's Army Corps, Oveta Culp Hobby, suggested that efforts should be initiated to reduce the number of women's sick call visits, but the Surgeon General's Office responded that the tendency to report to sick call was desirable preventive medicine. The major complaints were not associated with female disorders but were primarily respiratory and digestive disorders. Women reported 70 percent more visits than men and double the incidence rate of dysentery. Men, on the other hand, sought medical treatment more often than women for such conditions as pneumonia and rheumatic fever, and their hospitalizations tended to be of longer duration than those for women. Pregnancy rates were so low during World War II that no special pregnancy policy was enacted.

When women began to enter the military in relatively large numbers during the 1970s, their hospitalization rates were significantly higher than men's for almost all diagnostic categories and for such stress-related disorders as transient situational disturbances, neuroses, personality disorders, and gastrointestinal problems. Women's higher rates for these specific conditions were attributed to selection criteria, administrative policies and practices (e.g., many women may have been hospitalized because

there were no brig facilities or holding companies for them), and psychosocial factors unique to women (i.e., when ill, more women than men seek medical treatment).⁸

Another explanation was that the incidence of a stress-related disorder may be a manifestation of the adverse health effects associated with being a minority or "token" in a predominantly male (or "skewed") organization.⁹ Rosabeth Kanter's work in the late 1970s described a "skewed" population as one in which the percentage of the minority group was less than 15 percent, as is true for women in the military.¹⁰ Until the percentage of women in a group exceeded 15 to 20 percent, they would be expected to experience more stress, which could result in an increased incidence of stress-related problems. Interestingly, this hypothesis was tested in a research project conducted on officers—specifically, the Navy Nurse Corps, where men represented a minority in a female-dominated profession.¹¹ Both male and female Navy nurses were reported as having elevated hospitalization rates for several major diagnostic categories in comparison with other officer designators. Of the 11 stress-related disorders, however, male nurses' rates were significantly higher than their female counterparts only for the two disorders of ulcers and hypertension, conditions that typically have been reported as having a higher incidence rate among men than women.¹² Results of that study of Navy officers, therefore, do not support the theoretical position of the potentially distressing health effects related to being a "token" or a member of a minority in an occupation or organization. Similarly, E. Marlies Ott's study of skewed occupations shows that male nurses acknowledged experiencing advantages, as specified on several criteria, whereas policewomen reported experiencing disadvantages.¹³ The author concludes that the theory of numerical imbalance does not apply to men as a minority group in an organization primarily because the high status of men as a minority group is an important factor influencing their acceptance.

Extent of experience also has been considered a factor associated with the incidence of stress-related conditions. In the Navy studies cited above, the largest differences in hospitalization rates between men and women were found at the lowest pay grade and age levels. The rate differential in these hospital admissions between the sexes decreased at higher pay grades and ages. Such results suggest that as increasingly more women remain in the military and gain experience, their hospitalization rates would be expected to decrease.

Another hypothesis formulated was that as women attained positions of increased responsibility in an organization, or as they assumed increasingly more roles (e.g., motherhood, wife, career woman, care giver to

ing parents), their health status would be adversely affected. This prediction has been tested in the private sector, where the results indicated that the workplace was not more stressful for women than being in the home.¹⁴ The reasons women did not manifest stress-related symptoms were that the workplace seemed to enhance their sense of accomplishment and self-esteem, provided social support and interesting social contacts, and added to their economic well-being. The authors conclude that there is no evidence to show that employment is harmful to women. Moreover, as women reach higher levels of responsibility in the workplace, the risks of disease and mortality do not increase to the levels of their male counterparts, as had been expected. For women, therefore, employment seems to offer a buffering effect against the stressors of their family roles as contrasted with men who tend to view the home situation as a sanctuary from the stressors of work.

Comparisons across time have revealed that Navy women continued to have higher total hospitalization rates than men, although the rate differentials showed a gradual decline with time and a considerable narrowing for the major categories of infectious diseases, disorders of the respiratory system, and digestive conditions.¹⁵ Similar to reports from World War II, women's rates for acute upper respiratory diseases throughout the 1970s were higher than men's as contrasted with men's higher rates for pneumonia. By 1984, however, women's rates for acute upper respiratory infection, diarrheal disease, rubella, and infectious mononucleosis had declined to such an extent that the only significant difference between the sexes was observed for diarrheal disease. These results correspond in part with those reported on Army data, in that an overall decline in rates for respiratory disorders was also noted among Army men and women from 1982 to 1985.¹⁶

Another area of concern and limited knowledge was that of determining whether or not military environments represented an increased risk of reproductive dysfunction and cancer. Few, if any, research projects have been conducted on the incidence of spontaneous abortions recorded in military hospitals. To meet this need, a project should be designed to identify specific conditions in the environment that may be associated with these mishaps. Other proposed studies include assessments of birth defects, low birth weights, and infant mortality. Military personnel also are exposed to multiple carcinogens as are civilian workers in the private sector. With regard to the incidence of cancer among military women, results of a study conducted from 1965 through 1976 showed that women's reproductive organs were the sites of greatest susceptibility to neoplastic growth, although the number of cases was low.¹⁷ A disproportionately high

percentage of cases was noted for black women. The most frequently observed malignancies were for cervical cancer and unspecified neoplasms of the genital organs. No data on cancer incidence among Navy women have been published since those collected during the 1960s and 1970s.

Also to be examined were the incidence rates of pregnancy-related conditions, which have been identified as the most frequently occurring reasons for women's hospitalizations since the pregnancy policy was modified in 1975 to allow a pregnant woman to remain on active duty.¹⁸ Parenthetically, a pregnant woman can request a separation from active duty, which may not be honored if the woman's skills are deemed necessary for mission accomplishment. Estimates from the early 1980s indicated that approximately 10 percent of active-duty military women were pregnant at any time; the pregnancy rate for Army active-duty women in 1985 was reported at 9 percent for enlisted women and 5 percent for officers.¹⁹ About 11 percent of Navy women's separations from active duty during the early 1980s were recorded for reasons of pregnancy and parenthood; a higher percentage, 16.4 percent, was reported for Marine Corps women during the time frame from 1981 through 1985.²⁰

The final area to explore was that of accidental injury hospitalization rates throughout the years of the AVF. Since the mid- to late 1970s, women have been assigned to nontraditional jobs, ranging from aircraft mechanic to military police, as well as to such industrialized ships as tenders and repair vessels. Because of this shift to more physically demanding work, the risk of an injury would be greater than that predicted for women working in traditional jobs or stationed at shore installations. In addition, their relative inexperience with shipboard or field life may increase the risks of an accidental injury. Results of other research showed that younger, inexperienced men and women had higher accidental injury hospitalization rates than their older, more experienced counterparts.²¹ Also associated with injury rates is the possibility of a corresponding increase in the incidence of musculoskeletal conditions.

The purpose of this study was to stress the impact of time on such major events as a hospital admission and separation from service by examining diagnoses for all hospitalizations, reasons for separation from active service, and time of occurrence of these events across a 15-year period and phases of a career among three cohort groups of Navy enlisted women. The following specific questions were posed in this study: (1) Do the diagnoses of hospitalizations differ among the three groups and across time frames within each group? (2) Are there shifts in the reasons for hospitalizations across years within each of the three groups? (3) Do

sons for separations from active service differ by duration of months 1 years among three groups of Navy female cohorts?

Method

Data used for this study consisted of medical inpatient and career history information extracted from files maintained at the Naval Health Research Center, San Diego, Calif. These files included data collected since 1965 on hospitalizations, separations from active duty, and demographic changes. All women who enlisted between 1973 and 1987 were identified from the service history files ($n = 119,167$ women), and their medical inpatient records were extracted for the same time period. To examine the impact of time on hospitalizations and separations, the population across the 15 years of data was divided into three cohort groups of women who enlisted during 1973 to 1977 ($n = 31,822$) or the early years of the AVF, 1978 to 1982 ($n = 48,562$) or the beginning of women's assignments to ships, and 1983 to 1987 ($n = 38,783$) or the end of women's whens period.

For each of the three cohort groups (i.e., 1973–1977, 1978–1982, and 1983–1987), hospitalization data were compiled by one-to-two-year intervals across years throughout the entire 15-year period or until the end of 1987. Data from the career history file provided information on the duration of service in months until the separation date and identified types of attrition for various selected reasons (e.g., pregnancy/parenthood, personality disorders). Using months of service, person years at risk were computed for each time interval within each of the three groups. Hospitalization rates per 10,000 strength were computed for each of the 16 major D-9 diagnostic categories and several specific diagnoses with relatively high numbers of hospital admissions. Comparisons across and within cohort groups were conducted across phases of a career. Frequency and percentage distributions of hospital admissions and premature separations from active duty were compiled to provide overall values across and within cohort groups.

Results

Hospitalizations of Enlisted Women across 15 Years

A total of 91,724 hospital admissions was recorded during the 15 years of this longitudinal study. After computing frequency and percent-

age distributions on these records, results showed that pregnancy-related conditions represented the leading reason for women's hospitalizations, accounting for 33.7 percent of all admissions across the three cohorts. The second-ranking diagnostic category was genitourinary disorders at 10.3 percent. The categories that ranked third and fourth in numbers of admissions across cohorts were mental disorders (9.4%) and accidental injuries (6.4%). Percentages for the majority of the other categories were approximately 5 percent each.

Table 1 presents the rank ordering of diagnostic categories and the most frequently occurring specific disorders for the three cohort groups. As shown, the highest hospitalization rates were noted for the category of pregnancy-related conditions in each cohort group: 545.0 per 10,000 for the 1973–1977 group, 711.6 for the 1978–1982 cohort, and 709.0 in 1983–1987. A delivery was the most frequent reason for being hospitalized, with a total of 17,981 births recorded in naval hospitals for women who enlisted between 1973 and 1987. The second-ranked specific diagnosis was complications of pregnancy, which showed a more than twofold increase in hospitalization rates from the first to third cohort group. Possibly corresponding in part with this increase across cohorts was a decrease in hospitalizations for prenatal care, as shown under the category of supplementary classifications. A spontaneous abortion was the third-ranking specific pregnancy-related diagnosis with a total of 3,363 recorded in naval hospitals during the 15 years. From 1973, when funding for voluntary termination of pregnancy in federal inpatient medical facilities had been approved, until 1977, the number of hospitalizations for induced abortions across cohorts was the highest for the 1973–1977 cohort. The discontinuation of funding for abortions in 1978 was reflected by a corresponding decrease in rates beginning with the 1978–1982 cohort.

Hospitalization rates for the category of genitourinary disorders were fairly comparable across the three cohorts. Rates decreased across cohort groups for disorders of menstruation whereas rates increased from the first cohort to the last for diseases of the ovary. This trend mirrored a similar increase in rates for symptoms of the genitourinary system (summed under the category of symptoms and ill-defined conditions).

Mental disorders occupied the position of the third-ranked diagnostic category—with the highest hospitalization rates observed for alcohol abuse, followed by transient situational disturbances and personality disorders. Changes across cohorts from the first to the third included an increase in rates for transient situational disturbances and a decrease in neuroses.

Other findings showed that hospitalization rates for accidental injuries were higher for the earliest cohort than for the other two groups,

Table 1
Hospitalization Rates per 10,000 among Three Cohorts of Navy
Women by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related conditions	8,222	545.0	15,427	711.6	7,253	709.0
Deliveries	4,398	291.5	9,594	442.6	3,989	390.0
Complications of pregnancy	1,428	94.7	4,202	193.8	2,376	232.3
Spontaneous/other abortions	932	61.8	1,560	72.0	871	85.1
Induced abortions	1,464	97.0	71	3.3	17	1.7
Urological disorders	3,093	205.0	4,458	205.6	1,923	188.0
Diseases of parametrium/pelvic	621	41.2	991	45.7	435	42.5
Disorders of menstruation	489	32.4	590	27.2	173	16.9
Diseases of the ovary	255	16.9	598	27.6	310	30.3
Mental disorders	2,807	186.1	3,913	180.5	1,951	190.7
Alcohol abuse	536	35.5	1,190	54.9	371	36.3
Transient situational disturbances	567	37.6	652	30.1	580	56.7
Personality disorders	575	38.1	798	36.8	344	33.6
Neuroses	523	34.7	300	13.8	177	17.3
Accidental injuries	2,131	141.3	2,526	116.5	1,192	116.5
Symptoms/ill-defined conditions	1,713	113.5	2,315	106.8	1,149	112.3
Symptoms - gastrointestinal	662	43.9	725	33.4	256	25.0
Symptoms - genitourinary	269	17.8	525	24.2	314	30.7
Diseases - musculoskeletal system	1,738	115.2	2,386	110.1	966	94.4
Supplementary classifications	2,166	143.6	2,167	100.0	713	69.7
Medical/surgical aftercare	779	51.6	623	28.7	220	21.5
Prenatal care	559	37.1	347	16.0	84	8.2
Diseases - digestive system	1,791	118.7	2,201	101.5	1,021	99.8
Diseases - respiratory system	2,148	142.4	1,874	86.4	756	73.9
Hypertrophy of tonsils	357	23.7	485	22.4	207	20.2
Acute respiratory infection	437	29.0	84	3.9	25	2.4
Infective/parasitic diseases	1,723	114.2	1,579	72.8	822	80.4
Leishmaniasis	846	56.1	676	31.2	252	24.6
Malignancies	115	7.6	149	6.9	57	5.6
All other diagnostic categories	2,405	159.4	2,488	114.8	933	91.2
Total hospitalization rate	30,783	2040.5	42,010	1,937.9	18,931	1,850.6
Person years at risk	150,861.0		216,782.5		102,294.5	

which represented the time frame when women began to be assigned with greater frequency to nontraditional jobs and to shipboard duty. Decreases in rates across cohort groups also were noted for gastrointestinal symptoms, one of the stress-related conditions, and for acute upper respiratory infections. Hospitalization rates for malignant neoplasms were low with the leading forms being cervical, ovarian, and breast cancer, which accounted for 52.6 percent of all 321 cancer hospitalizations.

Time of Occurrence of a Hospitalization

In Table 2 are presented the hospitalization rates that were reported for each cohort during the first year of active duty. The highest hospitalization rates were observed for the categories of respiratory diseases (primarily acute upper respiratory infection) for the 1973-1977 cohort and the category of mental disorders for the two cohorts, with the highest rates observed for alcohol abuse and transient situational disturbances, respectively. Other specific diagnoses with high rates included induced abortions, gastrointestinal symptoms, neuroses, and personality disorders in the 1973-1977 cohort; complications of pregnancy and personality disorders for the 1978-1982 cohort; and complications of pregnancy and spontaneous abortions for the other cohort.

As shown in Table 3, hospitalization rates for pregnancy-related conditions ranked highest for each cohort after the first year of active duty. Rates for childbirth outranked all other diagnoses in each cohort, followed by induced abortions in the 1973-1977 cohort and complications of pregnancy for the other two cohorts. Spontaneous abortions occurred at relatively comparable frequencies across cohorts during this interval of a career. Rates for all other specific diagnoses were considerably lower than those observed for pregnancy-related conditions. Decreases in rates from the 1973-1977 cohort to the 1983-1987 cohort were the largest for the categories of induced abortions and prenatal care.

Hospitalization rates computed for the 2.5-to-4-year interval are presented in Table 4. Rates for pregnancy-related conditions tended to peak during this interval and remained at relatively high levels throughout subsequent years. Even after 9 to 10 years of service, for example, the hospitalization rate for deliveries was 288.3 per 10,000 in the 1973-1977 cohort and 441.0 per 10,000 in the 1978-1982 cohort. Similarly, hospitalizations for complications of pregnancy continued at high levels after 4 years of service for each cohort group. Also comparable to statements drawn from data presented in Tables 2 and 3, the rates in Table 4 for the

Table 2

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during First Year of Service by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related conditions	913	306.2	686	150.3	743	206.4
deliveries	94	31.5	125	27.4	174	48.3
complications of pregnancy	105	35.2	297	65.1	336	93.3
spontaneous/other abortions	170	57.0	234	51.3	223	61.9
induced abortions	544	182.5	30	6.6	10	2.8
Genitourinary disorders	587	196.9	794	174.0	566	157.2
diseases of parametrium/pelvic	145	48.6	225	49.3	141	39.2
disorders of menstruation	92	30.9	108	23.7	65	18.1
diseases of the ovary	28	9.4	102	22.3	108	30.0
Mental disorders	910	305.2	1,305	285.9	962	267.2
alcohol abuse	115	38.6	384	84.1	161	44.7
transient situational disturbances	153	51.3	203	44.5	335	93.0
personality disorders	222	74.5	291	63.8	156	43.3
neuroses	228	76.5	97	21.3	83	23.1
Accidental injuries	746	250.2	791	173.3	529	146.9
Symptoms/ill-defined conditions	498	167.0	564	123.6	402	111.7
symptoms - gastrointestinal	237	79.5	209	45.8	102	28.3
symptoms - genitourinary	28	9.4	54	11.8	72	20.0
Diseases - musculoskeletal system	295	98.9	354	77.6	221	61.4
Supplementary classifications	773	259.3	419	91.8	139	38.6
prenatal care	94	31.5	38	8.3	21	5.8
Diseases - respiratory system	1,044	350.2	641	140.4	310	86.1
acute respiratory infection	397	133.2	55	12.1	14	3.9
All other diagnostic categories	2,016	676.2	1,702	372.9	1,021	283.6
Total hospitalization rate	7,782	2610.2	7,256	1,589.7	4,893	1,359.1
Person years at risk		29,814.0		45,642.5		36,002.5

1983-1987 cohort were considerably lower than those for the 1973-1977 cohort for the categories of mental disorders and respiratory diseases.

In comparing rates after 4 years of service or the first enlistment, decreases were observed for almost all categories, except for slight increases in rates for genitourinary disorders and diseases of the musculoskeletal system. As stated above, the most vulnerable time for the occur-

Table 3

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during 1 to 2.5 Years of Service by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related conditions	2,405	661.2	4,684	819.4	4,030	1,028.0
deliveries	1,103	303.2	2,925	511.7	2,282	582.1
complications of pregnancy	324	89.1	1,236	216.2	1,321	337.0
spontaneous/other abortions	322	88.5	496	86.8	422	107.6
induced abortions	656	180.4	27	4.7	5	1.3
Genitourinary disorders	740	203.4	1,260	220.4	816	208.1
diseases of parametrium/pelvic	145	39.9	274	47.9	185	47.2
disorders of menstruation	122	33.5	184	32.2	65	16.6
diseases of the ovary	57	15.7	206	36.0	115	29.3
Mental disorders	851	234.0	1,197	209.4	725	184.9
alcohol abuse	128	35.2	416	72.8	165	42.1
transient situational disturbances	172	47.3	167	29.2	167	42.6
personality disorders	201	55.3	270	47.2	137	34.9
neuroses	153	44.8	91	15.9	77	19.6
Accidental injuries	624	171.6	762	133.3	463	118.1
Symptoms/ill-defined conditions	459	126.2	666	116.5	480	122.4
symptoms - gastrointestinal	192	52.8	251	43.9	107	27.3
symptoms - genitourinary	61	16.8	148	25.9	141	36.0
Diseases - musculoskeletal system	426	117.1	600	105.0	409	104.3
Supplementary classifications	352	96.8	450	78.7	332	84.7
prenatal care	223	61.3	140	24.5	46	11.7
Diseases - respiratory system	545	149.8	496	86.8	301	76.8
acute respiratory infection	21	5.8	10	1.7	8	2.0
All other diagnostic categories	1,888	519.1	1,912	334.5	1,253	319.6
Total hospitalization rate	8,290	2,279.1	12,027	2,104.0	8,809	2,247.0
Person years at risk		36,373.5		57,163.5		39,204.0

rence of hospitalizations for mental disorders; respiratory diseases (e.g., acute upper respiratory infection); accidental injuries; and infective and parasitic disorders was during the first 12 months of active duty, which was followed by quite consistent declines in rates throughout subsequent years. Comparisons of rates for these categories across time intervals revealed large decreases in rates for each of the three cohort groups. Specific conditions that reflected this trend in declining rates included all

Table 4

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during 2.5 to 4 Years of Service by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related conditions	2,010	720.6	4,774	991.3	2,146	966.9
Deliveries	1,217	436.3	3,114	646.6	1,316	593.0
Complications of pregnancy	359	128.7	1,260	261.6	625	281.6
Spontaneous/other abortions	200	71.7	393	81.6	204	91.9
Induced abortions	234	83.9	7	1.5	1	0.5
Genitourinary disorders	658	235.9	1,139	236.5	448	201.9
Diseases of parametrium/pelvic disorders of menstruation	139	49.8	256	53.2	92	41.5
Diseases of the ovary	78	28.0	148	30.7	34	15.3
Fetal disorders	65	23.3	149	30.9	74	33.3
Alcohol abuse	442	158.5	707	146.8	227	102.3
Transient situational disturbances	94	33.7	200	41.5	38	17.1
Personality disorders	117	41.9	132	27.4	67	30.2
Neuroses	84	30.1	141	29.3	47	21.2
Accidental injuries	64	22.9	57	11.8	11	5.0
Symptoms/ill-defined conditions	306	109.7	502	104.2	176	79.3
Symptoms - gastrointestinal	256	91.8	474	98.4	225	101.4
Symptoms - genitourinary	108	38.7	142	29.5	39	17.6
Diseases - musculoskeletal system	49	17.6	107	22.2	84	37.8
Supplementary classifications prenatal care	378	135.5	587	121.9	267	120.3
Diseases - respiratory system	325	116.5	475	98.6	188	84.7
Acute respiratory infection	152	54.5	93	19.3	17	7.7
All other diagnostic categories	283	101.5	365	75.8	125	56.3
Total hospitalization rate	8	2.9	11	2.3	2	0.9
Person years at risk	1,252	448.9	1,490	309.4	650	292.9
	5,910	2,118.9	10,513	2,183.1	4,452	2,006.0
		27,892.0		48,157.0		22,193.5

of the stress-related disorders, such as transient situational disturbances, personality disorders, neuroses, and gastrointestinal symptoms. Rates for spontaneous abortions were the highest during the 1-to-2.5-year time interval in each cohort, followed by gradually decreasing rates across subsequent time frames. Other results showed that the time of cancer incidence varied as would be expected because of differences in durations of latency periods for neoplastic growth — for example, a long latency for lung

cancer as contrasted with Hodgkin's disease, which strikes along a wide spectrum of ages.

Reasons for Premature Attrition from the Navy

In examining reasons for premature attrition from the Navy, as shown in Fig. 1, the percentages indicated that pregnancy and parenthood accounted for the highest proportions for each of the three cohort groups, falling within a range from 16.3 percent for the 1973-1977 cohort to 11.3 percent for the 1983-1987 cohort. Across the 15 years, the number of separations for pregnancy and parenthood was 15,730 or 13.2 percent of the total. Discharges for reasons of personality disorders and physical disabilities were the second- and third-leading reasons for a premature separation from service. The time interval when pregnancy or parenthood separations were most likely to occur with greatest frequency was determined to be during the 1-to-2.5-year time frame, which was followed by a gradual decline in rates across the remaining years of a career.

Discussion

Results of this study indicate that Navy enlisted women's health status has changed across the 15 years, a conclusion drawn from trends observed in their hospitalization rates. Both increases and decreases in rates occur across years and within cohort groups. Also to be discussed are the shifts in reasons for women's early separations from active duty.

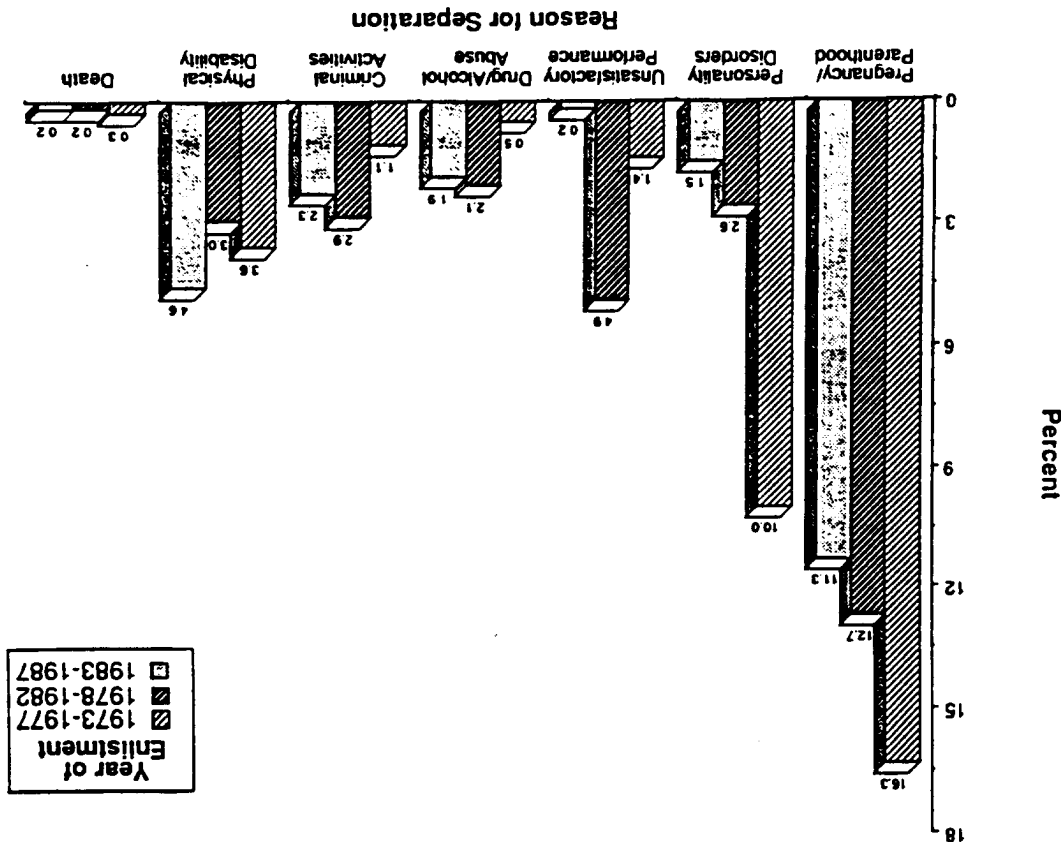
Increases in hospitalization rates for pregnancy-related conditions across the years are shown in this study, a change that corresponds with the implementation of the pregnancy policy stipulating that women can remain on active duty during and after their pregnancies. The percentage of all hospitalizations that are pregnancy-related is 33.7 percent for the 15 years of this study; researchers report a similar percentage among Army women, more than one-third of all hospital admissions. The research by Lois Verbrugge also corroborates the high rates for these conditions among women in the private sector.²² An explanation for these elevated rates is that such findings would be expected for women of the ages reported in these studies — namely, the fecund or childbearing years. Perhaps a more important finding is the time interval of an enlistment when hospitalizations for these conditions occur with greatest frequency. Of particular concern is the large increase in hospitalizations for childbirth reported after the first year of active duty, with the peak reported at the 2.5-to-4-

year interval and high levels recorded throughout the years of the follow-up period. These results reflect a need to examine the psychosocial circumstances of Navy life in order to determine why women would assume the role of motherhood during such an early phase of a Navy career. Specific preventive programs also should be considered for development and implementation, such as a comprehensive course on planned parenthood to be presented during recruit training and possibly during other phases of a career. Another program is a case management interventive process that prepares the pregnant woman for meeting the immediate demands of motherhood and provides education on planned parenthood for the future.²³

Another large rate increase in hospitalizations across the years is noted for complications of pregnancy. Possibly associated with this finding are the increased admission rates for spontaneous abortions, diseases of the ovary, and symptoms of the genitourinary system. The increase in these rates seems to correspond in part with a decrease in hospitalizations for prenatal care, which should be examined in terms of finding a possible relationship between a prenatal care hospitalization and a subsequent admission for complications of pregnancy or a normal delivery. The relatively high rates of spontaneous abortions suggest that further research is needed to identify the factors that may be associated with these incidents. A study of spontaneous abortions recorded in military hospitals would provide the baseline information required to determine the incidence by occupations and environmental settings. Perhaps a type of occupational reproductive hazard, such as a biologic agent, chemicals and metals, radiation, or stress, will be found in conjunction with the reported spontaneous abortion. Also to be considered is the finding that the incidence of these mishaps is the highest for the most recent cohort, 1982-1987. Overall, these results suggest a need to identify the circumstances potentially associated with hospitalizations for reproductive dysfunction. This examination would assess the impact on these conditions of such factors as age, occupation, work environment, stress, and health history. Results would establish the importance of these considerations in conjunction with a biologic factor or a woman's increased vulnerability to reproductive dysfunction.

Earlier research has postulated that being members of a minority group in a male-dominated environment (i.e., women in the military) would engender an increase in women's incidence rates of stress-related conditions.²⁴ Results of this study show that the first 12 months of active duty is the time frame of greatest risk for such conditions. During subsequent year intervals, a decrease in hospitalization rates is noted for all

Figure 1
Reasons for Premature Separation from the Navy among Women who Enlisted from 1973-1987



stress-related conditions, particularly for such diagnoses as gastrointestinal symptoms and mental disorders. A more comprehensive orientation program to prepare women for military life could have an impact on reducing the incidence of these disorders. Also shown in these data is a decrease across cohorts in percentages of separations and rates of hospitalizations for personality disorders, which probably reflects an improvement not only in the quality of women applicants but also a possible change in selection criteria. Other findings of this study indicate that increasing experience and assuming more responsibilities in the military do result in an increased incidence of stress-related problems; for example, after ten years of service, women's hospitalization rates for these conditions are less than 20 per 10,000 strength. John Ballweg and Li Li report that military women's perceived health status improves with age; results of their research show that as women become older, the number of self-reported health concerns decreases.²⁵ Conversely, the age group with the least positive health status is 20 years of age and younger.

Other results indicate that since the late 1970s hospitalization rates have decreased for mental disorders, respiratory diseases, infective diseases, and supplementary conditions. The continuing trend in declining admission rates for these conditions seems to point to a change in either the health status of Navy women who enlisted in the 1980s or in the type of treatment prescribed for such conditions. The decreases in rates for such acute disorders as upper respiratory infection and gastrointestinal problems no doubt correspond to changes that have occurred in treatment therapies. It seems likely that with the high cost of inpatient medical care reported at naval hospitals, a greater reliance is being observed in prescribing outpatient treatment and medications. The treatment modalities adapted since the 1970s have centered increasingly on outpatient care combined with various types of prescribed medications.

The decrease in accidental injury rates noted in this study counters the hypothesis that rates would increase as a result of an increment in the number of women assigned to nontraditional jobs and to shipboard duty. This prediction is based on women's overall lack of experience with physically demanding jobs and unfamiliarity with the circumstances of shipboard life. The decline in rates across cohorts is attributed to a difference in the quality of Navy enlisted women, effectiveness of the Navy's occupational training programs, and implementation of less risky ways to do a particular job. The decrease in rates across year intervals is associated with the positive impact of experience as a factor in the prevention of accidental injuries, a conclusion that supports earlier research findings.²⁶

In conclusion, results of this study point to many improvements in

Navy women's health status and no major decrements. The findings mirror those reported on the health status of women in the Army.²⁷ The decrease in the proportion of women prematurely separated from service for reasons of a personality disorder would also suggest improvements in the quality of women applicants and/or initial screening criteria. Other specific reasons for explaining the decline in women's rates include changes in treatment modalities, such as increases in the prescription of medications and outpatient care; modifications in policies concerning women; assignment of women to ships and other duty stations where inpatient facilities are less available; and cost containment endeavors. Future research efforts will explore the relationships of these factors with hospitalization and attrition rates.

Notes

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Military Psychology and Women's Role in the Military

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ABSTRACT

This chapter traces the history of women's role in the defense of their countries, including all member countries of NATO as well as other nations; discusses the policies affecting women's role and utilization in the military; examines military research findings on women's role in and contributions to the armed forces; and addresses the issue of developing a precise policy on women's role in future militaries, with special emphasis on their assignment to combat-related occupations.

During times of national emergency, women have served in the military whether in an official or unofficial capacity (Enloc, 1983). Throughout history, women have met traditional support needs of the military by filling the roles of laundress, cook, and nurse. Beginning in World War I, women were recruited for the first time to engage in the 'paper' war, to free up more men for the fighting war. Women's roles were further expanded in World War II, and more recently, have extended into the realm of combat occupational assignments in several countries. With less than a decade left of the 1900s, women increasingly are being used by militaries throughout the world to solve problems of personnel availability, quality, health, morale, and

readiness. The primary reason for this greater dependence on women is to offset the shortfall of male applicants attributable to the end of the 'baby boom.'

Since the 1970s, therefore, women have been increasingly and gradually integrated into militaries although this process has been without the benefit of full representation or a policy of total acceptance and utilization in all aspects of a country's defense. To ensure a woman's rights as a citizen and as a participant in the concept of equal opportunity for all military personnel, such a policy should be formulated, one that eliminates the exclusion of women from combat occupations and opens all specialties to men and women who meet

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the physical and mental qualifications. Several countries have implemented such a policy. To counter this human rights position, opponents argue against the full integration of women because of differences between the sexes in physical capabilities and health care utilization as well as women's supposedly adverse impact on 'male bonding.' The objectives of this chapter are (a) to trace the history of women's utilization in the defense of their countries, (b) to discuss the policies affecting women's role in the military, (c) to examine military research findings on women's role in and contributions to the armed forces, and (d) to address the issue of developing a precise policy on women's role in future militaries, especially their assignment to combat-related occupations. The historical perspective will center on a summary of data compiled on the United States (US), countries of the North Atlantic Treaty Organization (NATO), Israel, Union of Soviet Socialist Republics (USSR), and several other nations. Research findings highlighting military women's issues will concentrate primarily on results reported in the US because of the more extensive body of work published in that country.

WOMEN'S ROLE IN THE DEFENSE OF THEIR COUNTRIES

Women in the US Military

Women's role in the US military began during the American War for Independence. De Pauw (1981) reports that tens of thousands of women were involved in active combat, serving in artillery units (where the hundreds of 'Molly Pitchers' swabbed out the cannon with water), in the enlisted ranks as soldiers in men's clothing, in militia units, and in frontier warfare. To meet his army's demands for medical care, George Washington issued orders of the day at the Valley Forge for 'procuring as many Women of the Army as can be prevailed on to serve as nurses' (De Pauw, 1981). Nurses were paid the same as Washington's soldiers, or \$0.25 per day, and the matron or head nurse received double the amount (Treadwell, 1954).

During the US Civil War, a large number of women volunteered as nurses with both the Union and Confederate forces; many of these nurses also assumed roles as spies and scouts. Dr Mary Walker was the first female surgeon to serve in the Army—and was awarded the Medal of Honor in 1865.

The need to provide nursing care for the wounded increased during the Spanish-American War which resulted in the beginning of almost a century of dedication by nurses to the care of military personnel. In 1901, the US Army Nurse Corps was created and in 1908 the US Navy Nurse Corps. During World War I, almost 10 000 Army nurses were assigned to hospital units in Europe while approximately 13 000 women were enlisted as clerks, telephone operators, translators, camouflage designers, and fingerprint experts for the US Navy and Marine Corps. Recent graduates of nurses' training were obliged to serve in the military, many of whom cared for the thousands of victims of the 'Influenza Epidemic' of 1918. The impetus for the inclusion of women on active duty was the need for skilled manpower—women officially became 'new' manpower during World War I. By the end of the war, 34 000 women had served in the Army and Navy Nurse Corps, the Navy, Marines, and Coast Guard (Holm, 1982). Women's participation in the military had been strongly urged by General John J. Pershing who, although his recommendations were met with considerable resistance, continued to praise women's exceptional performance.

During World War II, approximately 350 000 women served in the US military. Women participated in all types of noncombatant jobs not only in the continental US but also in North Africa, Europe, India, Australia, China, and the Southwest Pacific area. An important example of women's service in World War II was that of a unique group of 1074 women who flew as Women's Airforce Service Pilots (WASPs) ferrying almost every aircraft in the Army Air Force inventory from the 'smallest trainers and hottest fighters to the biggest bombers' (Holm, 1982). They flew 'more than 60 million miles, ferried 12,650 aircraft, towed countless gunnery targets, and instructed hundreds of Air

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Force pilots' (Holm, 1982). Thirty-eight of these women pilots lost their lives performing their duties. Another dedicated group of women served in espionage and sabotage, and these women were found to be as brave and coldblooded as their male counterparts (Quester, 1982).

Also of extraordinary dedication were the nurses who followed closely behind wherever the US forces landed; many nurses were killed or wounded in action. Portrayed as noncombatants, nurses performed their duties in combat situations—they were in combat—especially since the advent in 1942 of the Mobile Army Surgical Hospital Unit (MASH) (Enloe, 1983). The Japanese captured 54 American nurses who remained prisoners of war in the Philippines for three years and continued to care for the sick and wounded in the prison camp until the end of the war (Kalisch & Scobey, 1983). Even though women officially have been excluded from combat roles, a recent study has shown that as many as 7.4% of US women veterans from World War II and the Korean and Vietnam conflicts were exposed to combat, and 73.5% of those exposed were nurses (Dienstfrey, 1988). An interesting finding from World War II reported by Quester (1982) was that women's morale was the highest the closer they were to the front and the lowest among women who served in the rear or who were labeled as only capable of doing 'women's work.'

As World War II progressed, civilian women were strongly encouraged to enlist to relieve men for combat jobs and to ensure that married men with families would not be drafted. Results of a Gallup poll showed that a surprising 78% of the US public responded that single women should be drafted before any more fathers—enlistment in the military should take precedence over any other responsibility that a woman had, except urgent family obligations (Holm, 1982). Although women were desperately needed—even a draft for women was seriously considered—many women who enlisted were subjected to sexual harassment and were faced with having to constantly defend their character. Moreover, for the 4000 black women who volunteered to serve, incidents of sexual harassment were compounded by racism which was an outgrowth of the policy of racial segregation that

was in effect during World War II. Black nurses were deemed ineligible and undesirable for service in the US Navy Nurse Corps, the rationale being that there were so few black sailors on active duty that black nurses would have no job to perform (Enloe, 1983). Cutting the legislative red tape to enable women's service to their country also tried the patience and adversely affected the health of those individuals who were responsible for meeting the high personnel needs of the war. A persistent belief in the US had been that women should be protected, which seemed to be especially entrenched by members of the US Congress (Quester, 1982). Even under circumstances of sexual harassment, racial segregation, sex discrimination, and the publicly voiced opposition of many legislators to women's role in the war effort, 350 000 women served during World War II. The final analysis of women's contributions to the war effort was that they served superbly.

With the end of World War II, the military was faced with determining whether or not there would be a permanent place for women in the peacetime services. After considerable debate, Congress passed the Women's Armed Services Act of 1948 on 2 June 1948, by a vote of 206 to 133. President Truman signed the measure that established permanent status for women in the Army, Navy, Air Force, and Marine Corps.

Few commentaries have been written about women's service during the Korean conflict while little was known, until the 1980s, of women's participation in the Vietnam conflict (see Marshall, 1987; Van Devanter & Morgan, 1983; Walker, 1985). Approximately 7500 of the more than three million American Vietnam veterans are women. More than 80% of the women in Vietnam were nurses; these women saw the worst of the Vietnam conflict, the endless procession of mangled bodies across the operating table (Enloe, 1982). According to a high-ranking officer (Holm, 1982), 'the injuries treated in Vietnam were unprecedented because the war was fought with small arms—booby traps, punji sticks, claymore mines, high-velocity bullets. Nearly all afflicted multiple wounds of the most vicious kind.' Women in Vietnam were subjected to the same combat risks as men in the same units. One nurse

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commented that during surgery when the unit was being shelled, members of the surgical team carefully lowered the operating table and continued the surgery on their knees. Since the Vietnam conflict, 9% of female and 15% of male Vietnam veterans have reported symptoms of posttraumatic stress disorder (Roberts, 1988).

During the 1980s, women's role in the US military was expanded to include assignments in four combat operations. The 1983 Grenada operation included 200 women of whom there were approximately two dozen women Air Force pilots, flight engineers, and loadmasters. Women served on tankers that fueled the bombers flown on the 1986 Libyan strike, and female naval pilots performed carrier landings as part of antiterrorist acts against Libya. Also identified were 248 women sailors who were assigned to the destroyer tender that went to repair the damaged frigate, *Stark*, in the Persian Gulf in 1987 (Schneider & Schneider, 1988). In late 1989, approximately 800 military women participated in the invasion of Panama, many of whom experienced actual combat. Although no research was conducted during these operations, both men's and women's overall performances were lauded as highly effective. No evidence was presented to show that readiness levels of the various groups were compromised by women's participation.

Policies Affecting Women's Role in the US Military

With the end of the Vietnam conflict and the implementation of the all-volunteer force (AVF) in 1973, numerous policies were enacted that influenced women's participation in the US military (Hoiberg, 1984). By 1967, the 2% ceiling on women's enlistments had been lifted and, in 1974, all occupational specialties were opened to women, except those directly related to combat. In 1972, the Equal Rights Amendment was passed (although it was never ratified by the required number of states), and the military assumed the role of a model in US society of equal opportunity. A gradual change from traditional to nontraditional job assignments occurred beginning in 1973; at present

approximately 43.5% of enlisted women have non-traditional jobs although the largest concentrations are in administration, clerical, medical, dental, and communications specialties (Defense Manpower Data Center, 1989).

Beginning in 1975, pregnant women were given the option of remaining on active duty during and after a pregnancy. If they remained, they were required to notify their supervisors that arrangements had been made for the care of their children in the event of rapid deployment. For pregnant women assigned to sea duty, the situation became more complicated in that a 1980 Navy policy required their immediate reassignment to a shore facility or a release from their enlistment contract. Modifications to this policy have been enacted which specify the activities from which pregnant crew members are exempt.

With a total of approximately 229 000 active duty women by the end of the 1980s, a fivefold increase since the beginning of the AVF in 1973, the percentage of military women in the four branches of the US armed forces is the highest (10.8%) of all countries (Defense Manpower Data Center, 1989). Restrictions exclude women from assignments to aircraft and naval vessels on combat missions, and Army and Marine Corps women do not serve in units or positions that have a high probability of combat involvement. Women have been assigned to noncombatant Navy ships since 1978 when the US Congress approved modifications to Section 6015 and President Jimmy Carter signed P.L. 95-485 into law. Women also can be temporarily assigned to combatant ships, but their tour cannot exceed 180 days. While somewhat less than 5000 enlisted women served on sea duty in 1987, the Navy plans to have 691 women officers and 8578 enlisted women assigned to ships by the end of 1991. Legislation is currently being considered to open all combat support positions in all services to women, which would include assignments on various support vessels (a total of 26 of the Navy's 37 combat logistics ships have been opened to women) and on all Air Force reconnaissance, training, and transport planes. Navy officials report little difficulty in finding women to fill sea billets (Longo, 1988). There are no restrictions on women's role in the

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Coast Guard; by 1977, the Coast Guard had two sex-integrated vessels.

Even without changing any of the combat exclusion policies and practices, Binkin & Bach (1977) concluded in 1977 that almost 600 000 military enlisted jobs (33%) could potentially be filled by women, although a more realistic number would be 400 000 or 22% of the total force. Results of a recent General Accounting Office (GAO) study, as summarized by Moore (1988), indicate that 1.1 million of the 2.2 million positions in the military are closed to women because of the combat-exclusion policy; of the remaining 1.1 million jobs, only 229 000 are filled by enlisted women and officers. Each of the branches of the military has established arbitrary quotas or recruiting limits on women, which the GAO has cited as discriminatory. Also discriminatory is the US Supreme Court decision that requires men, but not women, to register for possible military conscription.

Women in the Service of Other NATO Countries

Over the years from World War II to the present, almost all of the NATO countries have expanded the role of women in their militaries. Studies on the participation of women in the military in these countries have examined the changes not only in women's numbers but also in policies concerning their assignments to occupational specialties, unit locations, and positions of increased responsibility. As summarized from several sources, the following is a brief review of the history and status of military women in each of the NATO member countries, excluding the previously described US armed forces (Binkin & Bach, 1977; Enloe, 1983; Stanley & Segal, 1988).

Women in *Canada* have a long tradition of military service, dating back to the 1885 Northwest Rebellion and the organization in 1899 of the Canadian Army Nursing Service to serve with the Canadian contingent in the Boer War. During World War I, nurses were assigned to overseas hospitals, on hospital ships, and in field ambulance units; a total of 53 nurses died while on duty. By the end of World War II, almost 50 000 women had

served in the women's divisions and the medical corps (5000 nurses) of the Army, Navy and Air Force. Beginning with the human rights movement in Canada (and many other countries) and enactment of the Canadian Human Rights Act in 1978, opportunities for women in the Canadian military began to expand. By 1987, almost one-tenth (9.2%) of Canada's active duty force of 85 000 volunteers were women. As of that year, all restrictions on the employment of women were no longer in effect in all units in the air environment thereby allowing women to be trained as fighter pilots and to receive assignments in fighter, tactical helicopter, and anti-submarine helicopter squadrons. In early 1989, the Human Rights Review Tribunal ruled that the policy and practice of excluding women from combat duty in the Canadian armed forces was discriminatory on the grounds of sex; therefore, full integration of women into all units and occupations, except submarine units, was to take place with all due speed. An implementation plan is currently being developed to ensure that the integration of women proceeds steadily, regularly, and consistently toward the goal of complete integration in the next 10 years.

During World War II in *Denmark*, women were active in the Resistance Movement against the Nazis' five-year occupation; Sorensen (1982) estimates that as many as 700 women participated, with possibly less than 100 being interned in concentration camps. Effective in July 1988, Denmark lifted restrictions on women's assignments in operational combat units thereby permitting women to be assigned as tank drivers, paratroopers, commandos, and infantry soldiers. As volunteers, women currently comprise 5.2% of the total force strength of less than 16 000; women also serve in the Women's Home Guard (Army, Naval, and Air Force) where they receive basic training in the evening and on weekends and can 'graduate' to specialized training in either the armed forces or the Home Guard. At present, the number of women in the Home Guard is about 3000, and less than 2000 women serve in the Ground Observer Corps.

French women's participation during World War I was quite considerable in that 30 000 nurses had accepted enlistment into the military health

corps (in addition to the 100 000 nurses and ambulance drivers who were employed by the Army's health services), and more than 150 000 women served in clerical and ancillary functions (Martin, 1982). During World War II, the number of women who served in the auxiliary female military sections of the French Army, Navy, and Air Force totaled 14 000; these uniformed women were employed in medical capacities as well as clerical and administrative positions (Martin, 1982). Many brave women were also members of the Resistance Movement. At present, women do not serve in combat roles in the Army, Foreign Legion, or Air Force, and less than 1000 have volunteered for national service. Women are not only barred from all combat-related duties, they are also excluded from many aircraft and shipboard occupations (e.g. navigators) (Martin, 1982). Their assignments, however, reflect a shift from traditional clerical positions to more technically oriented jobs.

During World War II, the concept of requiring women to serve a 'duty year' in Germany was initiated which eventually led to the formation of women's auxiliary services, but no woman served in combat, and the auxiliaries did not have military status (Tuten, 1982). The armed forces of the *Federal Republic of Germany* only accept women volunteers as medical officers (physicians, dentists, pharmacists, and veterinarians); 7.1% of all medical officers are women, as reported by Stanley & Segal (1988). Because of the declining annual draft-eligible pool of 18-year-olds at present, the shortfall for the armed forces may very likely have to be filled by women, which no doubt will be resisted by the conservative military profession.

Women constituted 15% of the revolutionary army in *Greece* during the civil war (1944 to 1949), and 250 women were honored as resistance heroines for their contributions during the German occupation from 1941 to 1944 (Brown & Safilios-Rothschild, 1982). The percentage of women in the Hellenic Armed Forces in *Greece* has remained relatively stable during the 1980s at somewhat more than 1.0% or almost 1800. Women can be conscripted during times of national emergency, but cannot be assigned to combat units.

In 1984, *Norway's* Parliament voted to permit

women to serve in combat roles and has opened all enlisted and officer positions to women in the Army, Navy, and Air Force. Somewhat less than 600 women currently serve in the Norwegian forces, a number that represents 1.4% of the total strength; they can also choose to serve in the land or naval Home Guard.

One of the major national emergencies that promoted and sanctioned women's official military role in the *United Kingdom* was the Crimean War, which brought international prominence to Florence Nightingale and the nursing profession and resulted in the formation of a permanent women's nursing service in 1881 (Goldman & Stites, 1982). During World War I, approximately 80 000 British women served in military units, performing in clerical, transportation, quartermaster, and communications functions. According to Goldman & Stites (1982), the military during World War I was perfectly happy to have the services of women, but not to have women in the service. By the midpoint of World War II, a total of 450 000 women were on active duty, serving not only in the Army but in 57 different Air Force specialties from transport to code work, radar, and parachute repair as well as in the Navy as drivers, clerks, housekeepers, and communication and technical specialists (Goldman & Stites, 1982). Similar to their World War I and II experiences, women at present are still restricted from participating in direct combat roles or at war establishment posts where combat could occur. However, they have been recruited to serve unarmed in the women's unit of the Ulster Defence Regiment in Northern Ireland. Women represent 5.1% of the total force strength, with almost 16 500 women on active duty in 1987.

Women's military status in the other NATO countries, which has been quite limited according to Stanley & Segal (1988), may be summarized as follows. *Belgium* has no combat restrictions on women serving in any military post, including combat; less than 4000 women have volunteered to serve on active duty, which accounts for 3.9% of the force as of 1987. *Iceland* does not have its own military, while women in *Italy* and *Spain* currently are excluded from service in the military. In 1987, women were accepted for the first time in the all-

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Women's military was during the during the War men did indeed see in infiltration, since 1982). Goldman 16% of the Palestinian women. While others serve, wireless constructors, driver total of 114 women serving in the military

volunteer force of *Luxembourg*. Opportunities for men and women in the Air Force, Navy, and Army of the *Netherlands* are identical; however, few women can meet the physical qualifications for the Army's positions in infantry, cavalry, and engineering. Women do not serve in the Marine Corps or on submarines. In 1984, their percentage of the total strength was reported as 2.9 or somewhat more than 1100. *Portugal* has reported that less than 10 women medical officers comprise the extent of women's role in the Portuguese military in 1986, although the number is expected to increase. Women in *Turkey* may volunteer to serve only in the officer corps—less than 100 currently are serving.

Women in the Service of Other Countries

Although the *Israeli* Army frequently is cited as effective in its conscription and use of women as soldiers, the situation in the Israeli armed forces since 1949 is that women only serve in noncombatant roles. Thus, contrary to popular belief, Israeli women do not perform in combatant roles, but rather form a nucleus of clerical, administrative, and service workers. Women's participation, however, is important not only from an economic position—the Army would have to hire thousands of civilians to perform the needed clerical and service functions—but also from a morale consideration. Their participation emphasizes the fact that the nation's defense is everyone's responsibility and obligation (Rolbant, 1970).

Women's most active contribution to defense was during the decade of 1941–1951, especially during the War of Independence when Israeli women did indeed serve along with men in units trained in infiltration, surprise attacks, and assault (Bloom, 1982). Goldman & Wiegand (1984) reported that 16% of the Palmach, or commando troops, were women. Women also commanded combat units while others served as nurses, food preparers, saboteurs, wireless operators, medics, teachers and instructors, drivers, clerical workers, and adjutants. A total of 114 women were killed in that war while serving in the military.

The Women's Army Corps (CHEN or Chail Nashim) was created in September 1948 and has continued to this day to recruit, train, and administer to women in the military (Gal, 1986). Compulsory service for women is 20 months, as contrasted with 36 months for men, although exemptions for women include marriage, motherhood, educational limitations, and religious convictions. Their role has been expanded, as noted by the opening to women of such jobs as fighter aircraft mechanic, weapons technician, artillery reconnaissance, etc. (Goldman & Wiegand, 1984).

One of the first contemporary societies to use women extensively in its armed forces was the *USSR*, beginning as 'women soldiers' in World War I, followed by their participation in the Revolution from 1918 to 1920 (O'Brien, 1982). Approximately one million women served during World War II. While the highest percentage was assigned to rear areas to release men for combat duty, women also provided combat units and air regiments that flew combat aircraft. A total of 23 women fliers were named Heroes of the Soviet Union; 91 women in all received this highly esteemed award (Griesse & Stites, 1982). Women also were assigned to combat units where they served as snipers, machine gunners, and tank crew members (O'Brien, 1982). Estimates of women's strength in the armed forces today range from 10 000 to no more than 30 000 of a total force of four million.

The opportunities for women in the *Australian* military continue to expand: women in the Navy now serve in all areas except on aircraft and ships, women in the Army are employed in most noncombat occupations, and the Air Force assigns women to a majority of musterings including aircraft technical trades (van Gelder & Eley, 1986). In 1983, approximately 6.4% of Australia's forces were women (less than 5000 in number).

Women in *Vietnam* also participated in that nation's struggle for unification; estimates indicate that women made up relatively large proportions in the lower levels of the People's Liberation Armed Forces, and 40% served in positions of regional commanders during the early 1960s (Duiker, 1982). Women were found to be particularly effective in liaison and espionage work. Evidence has been

reported that women also participated in many uprisings and attacks against all major cities in South Vietnam during the TET offensive in early 1968. They provided high percentages of the villages' self-defense militia and served in bomb-defusing units, on anti-aircraft teams, and in units that captured downed American flyers.

Japanese women began to serve in 1967 in the Ground Self-Defense Force and in 1974 in the Maritime Self-Defense Force and the Air Self-Defense Force; these forces are for defense and internal security only (Wiegand, 1982). Their inclusion occurred as a direct result of the decrease in the numbers of male volunteers for military service and also as an indirect consequence of a general movement toward increasing opportunities for women. This relatively recent utilization of women in the defense forces was attributed to nothing more than 'an oversight.' Approximately 3000 women serve in the defense forces in jobs ranging from counselors, medical care providers, photographers, and administrative personnel to aircraft weapons, engine, and fuselage maintenance workers.

Jancar (1982) traces the contributions of Yugoslav women to the military from 1919, the formation of Yugoslavia, to the present day. During World War II, the Yugoslavs fought a war of liberation as well as a civil war, and one which involved social revolution, with as many as two million women serving on the partisan side and 100 000 in the National Liberation Army. Partisan life was especially attractive to women because it provided them with opportunities to take courses, such as reading, writing, and nursing; to experience feelings of adventure, equality, and camaraderie; to participate in entertainment programs; and to prove that they were at least as brave and courageous as men. Only one in 20 women was at the front while the rest provided support in the rear. At present, all able-bodied men, women, and children receive paramilitary training at their school or work place. While women do serve in the Territorial Defense Forces, primarily as medics, very few are in the armed forces today.

During the seven and a half years of war against French colonialism, the Algerian people fought the

might of France with guerrilla warfare, urban terrorism, and a worldwide political campaign (Amarane, 1982). There were almost 9000 women militants in the civilian and military sectors; the major contributions among those who served in the civilian sector included sheltering and feeding combatants; conducting liaison and guide work; collecting medicine, money, and munitions; and performing terrorist actions. Women in the military sector were primarily cooks, laundresses, and nurses, with less than 2% bearing arms. Even though women fought courageously for the cause of liberation, their subsequent position in Algerian society has not continued to evolve toward greater participation, except in the realm of education.

Women also served in other liberation armies, such as in China where the Women's Association mobilized women 'to sabotage and repair bridges and roads, to prepare food for the soldiers and carry it to them, to rescue and nurse the wounded, and to carry messages and gather intelligence under the cover of going to market or visiting relatives' (Enloe, 1983). African women served in Guinea-Bissau's liberation army in which they were taught to use weapons, but they primarily performed in support roles in the army's cause of expelling the Portuguese in 1974 (Enloe, 1983). By way of contrast, Nicaraguan women during the liberation war against Somoza participated as combatants although at first they only provided medical care for the wounded (Enloe, 1983). According to Enloe (1983), Nicaraguan women are trained as soldiers and as officers; training is conducted separately for men and women. There is even a women's unit, the Juana Elena Mendoza Infantry Company.

A 'People's Army' of approximately 200 000 men and women, in addition to its regular standing army of 100 000, has been raised in Jordan to fight off any incursion into that country by Israel or any other nation (Abu Nab, 1983). The initiation of voluntary service of women, who are between the ages of 16 and 45, is the first time that women have been accepted into the ranks of the fighting services. In another Middle Eastern country, a '20 million-strong' Iranian Army was initiated in late 1979, which included women and girls as young as

14 years of age as 'komitehs,' how to fire a rifle, and a daily television instruction.

RESEARCH CONTRIBUTIONS

Military Psychology

The role of military personnel in the development of the class system, respectively, in the general Classification of which was adopted by the Armed Forces in 1950, and the Military Battery (version of AS 1989). A major military, then selection or selection.

Since the advent of military psychology has been experienced a variety of US social science, an extensive military. Military funded to examine performance during as well as effectiveness (Binkin & Bacon and sex differences, 1979, 19 service academy progress was not only by the media by the media DeFleur & W. 1978; Stiehm,

14 years of age (Cooper, 1980). Taught by the local 'komitehs,' both male and female trainees learn how to fire a G-3 rifle; lessons are supplemented by a daily television program that provides weapons instruction.

RESEARCH ON WOMEN'S ROLE IN AND CONTRIBUTIONS TO THE MILITARY

Military Psychology and Women in the Military

The role of psychologists in solving US military personnel issues began during World War I with the development of the Army Alpha and Beta tests for the classification of literates and illiterates, respectively. Other tests followed: the Army General Classification Test (AGCT) in World War II which was administered to over nine million inductees, the Armed Forces Qualification Test (AFQT) in 1950, and the Armed Services Vocational Aptitude Battery (ASVAB) in 1974, and a computerized version of ASVAB in 1987 (Driskell & Olmstead, 1989). A major contribution of psychologists to the military, therefore, has been the development of selection or screening instruments.

Since the advent of the AVF in 1973, the role of military psychologists and other social scientists has been expanded to include research on a wide variety of US military concerns. A review of the social science research conducted since 1973 reveals an *extensive* library of studies on women in the military. Military psychologists, for example, were funded to examine sex differences and similarities in performance during recruit and occupational training as well as on the job (e.g. Kowal, 1980); the cost effectiveness of men and women in the military (Binkin & Bach, 1977; Hoiberg & Thomas, 1982); and sex differences in health care utilization (Hoiberg, 1979, 1980, 1984). After women entered the service academies for the first time in 1976, their progress was observed, researched, and reported not only by the social scientific community but also by the media (V. Adams, 1980; J. Adams, 1984; DeFleur & Warner, 1987; Priest, Vitters, & Prince, 1978; Stiehm, 1981).

Women in the Field

In examining women's integration in the field, three major studies were conducted during the 1970s: women on board the USS Sanctuary and the US Army Research Institute's two studies on the impact of women content in the unit on field performance (US Army Research Institute, 1977; Johnson *et al.*, 1978). Beginning in 1972, the hospital ship, the USS Sanctuary, had an integrated crew with women serving in all work groups, including one in the engineering department (Binkin & Bach, 1977). The successful integration of women on this hospital ship no doubt provided the background data in support of the subsequent policy change to assign women to other noncombatant ships. The two Army studies showed that women in support and combat-support units and in combat unit headquarters above battalion level did not adversely affect unit performance. Women were proven to be 'good soldiers,' a finding that certainly corroborated the exemplary performance of women who served during World War II. Other psychologists and sociologists examined women's integration aboard the US Coast Guard Barque Eagle (Safilios-Rothschild, 1978), in a field-deployed military unit on a combat exercise (Devilbiss, 1985), and on Navy ships (Thomas, 1984).

In the Canadian armed forces, a series of controlled trials was conducted from 1979 to 1984 with women assigned to nontraditional roles in land, air, and sea environments as well as at the isolated Canadian Forces Station at Alert in the high Arctic (Park, 1986). The objective of these trials, which were titled *Swinter for Service Women in Non-Traditional Environments and Roles*, was to provide data on any physical, psychological, or social problems that might arise if all military occupations were opened to women without any type of restriction. Conclusions drawn from these trials were that the assignment of women to the specified units did not have a detrimental impact on operational effectiveness. Because of some limitations of the SWINTER trials, a series of two-year, sex-integrated trials (CREW for Combat Related Employment of Women) was initiated in 1987 to

examine the risks involved in employing women in all units and occupations closed to them, with the exception of submarines. With the removal of the combat exclusion policy in early 1989, however, these trials were not to be conducted as trials *per se*, but were to become the initial phases of the integration process of women into all units of the Canadian armed forces. The only restriction placed on women's role in the Canadian armed forces is that women will not be assigned to submarines because of privacy considerations.

Another study in the field examined female 'GIs' during an extended long-term deployment in Honduras during 1984. Moskos (1985) interviewed 48 female soldiers (41 enlisted women and 7 officers) on such topics as career opportunities, enlistment expectations, job performance, fraternization, privacy and cleanliness, homosexuality and sexual harassment, and combat assignments. He concluded that the incorporation of women in the field conditions of Honduras was a success story—women worked as effectively as men in this difficult environment. The cohesiveness of the groups that he observed may have evolved during the field exercise or it might have been established prior to arrival in Honduras. The stability of the work groups was perceived as a reflection of the fact that the longer the duration of the male-female relationship, the greater the likelihood that women would be treated as individuals rather than as sexual categories. Enlisted women stated during interviews that they held no desire to volunteer for the combat arms of the military, if that were allowed, as contrasted with female officers who knew that their careers were limited because of the female combat exclusion rule. Moskos concluded that the factors tending to ensure greater integration of women into field units were their relatively high levels of enthusiasm, educational achievement, and intelligence.

Cohesion, Bonding, and Sexual Harassment

Evidence presented from the aforementioned historical summaries, studies, and observations indicate that women have served, and no doubt will continue to serve, their countries in combat zones and roles. Conclusions drawn by several re-

searchers and inferred from the historical summaries underscore the fact that cohesion and male bonding are not adversely affected by women's presence in military groups (Quester, 1982; Devilbiss, 1985; Moskos, 1985). However, the belief persists, despite research findings to the contrary, that the presence of women in combat groups would dilute male bonding and decrease unit effectiveness (Enloe, 1983). Cohesion in a group can be described as a certain closeness, or common attitudes, behavior, and performance, that is lacking in other groups. Cohesion is affected by group solidarity, leadership quality, and adequacy of command and supply channels. These definitions fail to include any mention of the sex of the group, which suggests that sex becomes an issue most notably during the initial stage of women's entry into traditionally all-male occupations. Other researchers have postulated that bonding seems to be primarily related to the situation, circumstances, or environment—a commonality of experience shared by everyone in the group which is the basis of fostering bonding and cohesion (Hoiberg, 1984; Devilbiss, 1985; Moskos, 1985).

Incidents of sexual harassment have occurred in the US military although the services do have prevention programs that place the responsibility for maintaining professional, harassment-free, work environments on the shoulders of all supervisors and managers (Hoiberg, 1984). The US Navy, for example, requires all member agencies to provide training on the prevention of sexual harassment to all supervisors and managers. Schneider & Schneider (1988) report that the two groups of individuals most likely to be accused of harassment include older members of the military, who might not have the necessary skills to communicate appropriately with women, and younger members with a macho self-image who may have difficulty relating in a professional manner to women in a work setting.

Health-care Utilization of Military Men and Women

The relatively high incidence rate of health-related conditions among women has been identified as

one of the policies concerning women in the military has been raised in several countries as incidence rates for mental disorders was 100% during World War I. The US Army reported 36% above the Women's Army Corps. A study taken to reduce visits, but the results showed that the tenable preventable major combat disorders but not as the Men, on the treatment for pneumonia, tended to be women. The identical. Women's instance was disqualified from active duty, climate, menstruation, nancy was so not warrant.

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Comparisons of health-care utilization revealed that women's rates were higher than men's in all rates that

one of the major considerations in formulating policies concerning the expanded utilization of women in the US military. No doubt this issue has been raised during policy-making sessions in other countries as well. Historically, the potentially high incidence rate of gynecological and obstetrical disorders was most frequently cited as sufficient evidence against the increased use of US women during World War II. At that time, the sick call rate of US Army women for all reasons was reported at 36% above men's rate. The Director of the US Women's Army Corps requested that steps be taken to reduce the number of women's sick call visits, but the Surgeon General's Office advised her that the tendency to report to sick call was desirable preventive medicine (Treadwell, 1954). The major complaints were not associated with female disorders but were primarily for such acute conditions as the common cold (70% more than men). Men, on the other hand, were more apt to seek treatment for more serious conditions, such as pneumonia, and the length of their hospital stays tended to be of greater duration than that of women. The injury rates between the sexes was identical. With regard to menstrual disorders, no instance was recorded in which women had been disqualified from serving in any Army job or station, climate, or area for reasons associated with menstruation (Treadwell, 1954). The rate of pregnancy was so low during World War II that it did not warrant any special study or policy.

From that time until 1975, the pregnancy policy stipulated that pregnant women would be automatically separated from the US military. At present, a pregnant woman can either remain on active duty or request a separation; however, her request might not be honored if her skills are deemed necessary for mission accomplishment. Current estimates indicate that approximately 10% of active duty military women are pregnant at any time; about 11% of women's separations from active duty are for reasons of pregnancy or parenthood.

Comparisons between men's and women's health-care utilization rates across the years revealed that women continued to have higher overall rates than men although differences in rates

have gradually decreased. During the 1970s, when women began to enter the military in relatively large numbers, their hospitalization rates were significantly higher than men's for almost all stress-related disorders, which seemed to be a manifestation of women's experiencing the effects of being a minority or 'token' in a predominantly male organization (Hoiberg, 1980). By 1984, the rate differentials between the sexes for these disorders as well as for all infectious diseases had narrowed considerably (Hoiberg, 1987). The largest differences in rates were noted at the lowest pay grade and age levels, which suggested that as increasingly more women remained in the military and gained job experience, their hospitalization rates would be expected to decline. Other reasons for the large decreases observed in women's rates included changes in treatment modalities to reflect increases in the prescription of outpatient care and medications, modifications in the Navy's policy toward women, assignment of women to ships and other duty stations where inpatient facilities are less accessible, and cost containment endeavors. Also noted was the finding that women had a higher rate of acute upper respiratory diseases as contrasted with men's higher rate for pneumonia, results that corresponded with those reported from World War II. The highest hospitalization rates for women were observed for pregnancy-related conditions (Hoiberg & White, 1989).

Indices of Effectiveness and Noneffectiveness in the Military

The beginning of the AVF also introduced an increase in the percentage of first-term attrition—from 26% in 1971 to 37% in 1974, for example (Nelson, 1986). Across the years, overall attrition rates have not differed significantly between men and women. In comparing incidents of administrative problems (e.g. unauthorized absences (the most common legal problem or crime committed in the military), and drug-related episodes), men's rates were significantly higher than those for women (Hoiberg & Thomas, 1982). Among women, the leading reason for a premature separation from the US military is pregnancy or parenthood.

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Women's Motivation to Serve

When one considers the opportunities available in the US military, as contrasted with those in the civilian community, three distinct career and training advantages stand out (Schneider & Schneider, 1988). First, the military is unique in that special training courses are provided for almost all jobs. In addition to providing basic and advanced training programs for nearly all occupational specialties, the military also offers remedial training for individuals who enter the service with educational deficiencies. Second, the US military has a policy whereby all personnel either progress up their career ladders or they have to leave. No one remains for years at an entry-level, dead-end job. Third, personnel are given responsibilities at a relatively young age in occupational positions that typically take years to achieve in the civilian community. Perhaps the most important difference between the civilian and military community is the policy in almost all militaries of equal pay for equal work among men and women in the same jobs. Moreover, women's participation in the US military has had a positive impact on both their active duty and postmilitary economic status. Women, therefore, look to the military as an avenue leading out of low-paying, dead-end jobs; stifling family or community environments; or unsatisfactory relationships. To most women, the military offers good pay, training opportunities, future college enrollment, security, free health care, and adventure. Many of these advantages have been reported by authors of studies conducted in countries other than the US.

The opportunities for advancement seem to differ between men and women, which has been attributed to the more stringent promotion requirements for the jobs that women have in the military. Within a skill, specialty, or designation, however, competition between men and women should be equitable. Another consideration is that a woman's advancement might be hindered because her daily work assignments may not be directly related to her actual occupational specialty. Also, the combat exclusion policy in the US armed forces denies women the opportunities to apply for combat specialties where promotions tend to be the fastest

and the bonuses the largest (Schneider & Schneider, 1988). For women officers, the combat exclusion policy serves as a deterrent in achieving the highest levels of leadership, such as promotions to star rank. Similar advancement restrictions may be seen in military organizations in other countries as well.

Women and National Security

The concept of US national security, which is based on the principle of deterrence, encompasses not only protection from military attack but also a responsibility to the global community. Janowitz (1978) builds on this relationship between the armed forces and the social and political order, by incorporating the term of 'social control' which is 'the capacity of a social group, including a whole society, to regulate itself.' This self-regulation implies, according to Janowitz, 'a set of "higher moral principles" beyond those of self-interest.' The emphasis on the institutional aspect is focused on a cluster of core concepts: professionalization, citizenship, institution building, and legitimacy. The idea of professionalism reflects, apart from expertise and corporateness, a notion of service to the nation, responsibility, and sensitivity to the consequences of military activity.

The role of the citizen in national security has also changed since the end of conscription, which corresponds with the introduction of the marketplace or occupation basis of the AVF (Moskos, 1984). These shifts in the roles of both the professional and citizen soldier and the change in orientation from institution to marketplace or occupation have also lessened the potential heroic component of service in the military. In performing one's job in the military, rather than one's duty, the concept of heroism is diminished.

In viewing the AVF as a marketplace, the military becomes an employer with over two million jobs as well as the largest single vocational training institution in the country. The restrictions placed on their enlistments deny to women equal opportunities to compete for these jobs and training. As

noted above, the opportunities, college education.

In viewing the military's restrictions reduces their opportunities to serve on active duty. The deterrence of its technical/technical way for an increase to become involved in assignments. The marketplace or be no solid justification findings from the continuing almost all militaries.

WOMEN

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noted above, the AVF offers equal pay, training opportunities, and the possibility of receiving a college education.

In viewing the AVF as an institution, the US military's restriction on women's enlistments reduces their opportunities to fulfill an obligation to serve on active duty, to fulfill their role as a citizen. The deterrence stance of our national security with its technical/technological basis should pave the way for an increase in the opportunities for women to become involved in a wider range of military assignments. Thus, it seems that under either a marketplace or institutional armed force there can be no solid justification, with or without research findings from the social scientific community, for the continuing restrictions on women's role in almost all militaries.

WOMEN'S ROLE IN FUTURE MILITARIES

As the population of young people continues to decline, recruiters from industry, colleges and universities, and the military will be vying for the most qualified and talented youths to meet their personnel, enrollment, or recruitment goals. This need for bright, technologically sophisticated young people to serve in the military is not likely to diminish. According to Binkin (1986), 'the prospect that the US armed forces might need to attract and retain a larger number of technically proficient individuals to handle sophisticated weapon systems would pose a considerable challenge to an institution that traditionally has functioned with people of average ability.' The US military at present rejects 25% of the population for physical and mental reasons; the Army accepts no more than 35% nongraduates of high school and no more than 20% scoring beneath the 30th percentile on the ASVAB (Danzig, 1986).

The products of mechanization have reduced the need for high percentages of soldiers assigned to infantry-type duties: from 90% in the Spanish-American War, to 60% by the end of World War I, approximately 35% by the end of World War II,

and 16% in 1985 (Binkin, 1986). When one considers aerial combat, the percentage of combatants is quite small with the majority of positions concentrated in preparing for and repairing from combat. The percentage of noncombat positions open to women could be as high as approximately 76% in the Air Force, 50% in the Army, and 38% in the Navy (Quester, 1982). The increase in mechanization has also created a decrease in the need for physical strength to perform work tasks effectively.

The need of each branch of the military is for a higher quality enlistee; the US Army, for example, requires fewer soldiers in combat areas and more in combat support and combat service, especially to perform increasingly more difficult electronic maintenance. Approximately 21% of all job assignments are noted for electronics-related occupations (Binkin, 1986). In the US Air Force, people with high aptitude for electronic skills will increase one-third by the year 2000; an increase of 11% in technically oriented individuals is projected for the Marine Corps. Overall, there will be an increase of 30% in electronics occupations, a 20% increase in mechanical positions, and a decrease by as much as 20% in administrative specialties. These same trends are evidenced in militaries throughout the world.

At present, it is apparent that all militaries need a precise policy on the utilization of women. In the past, women's role was established in response to the circumstances of the conflict, rather than in terms of a deliberate position concerning their utilization. Although women serve, their roles remain restricted by their exclusion from assignment to combat jobs. During national conflicts, women have proven their capabilities to function in a military role in a combat environment, even under direct hostile fire (Holm, 1982). To maintain combat restrictions is to deny women equal opportunity, treatment, and experience in the military. Until these restrictions are removed, military women cannot experience the full opportunities offered as well as 'the essence of their organization's purpose' (Stiehm, 1981). The most equitable solution, therefore, would be to implement a policy of establishing the physical and mental standards of each occupational specialty and opening all jobs to those men and women who meet the qualifications.

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Cognitive Pattern in Men and Women Is Influenced by Fluctuations in Sex Hormones

Doreen Kimura and Elizabeth Hampson

Sex hormones (e.g., testosterone and its metabolites, dihydrotestosterone and estradiol) are known to influence the organization of the mammalian brain during critical periods in development, before or just after birth, and can permanently alter an animal's propensity to engage in many sexually dimorphic behaviors. In adulthood, sex hormones continue to activate certain neural circuits and their consequent behaviors. For example, in many species, female sexual activity is facilitated by high levels of ovarian hormones during the fertile phase of the cycle, and male sexual behavior is enhanced by high levels of testosterone. There is evidence that these hormonal influences may also extend to problem-solving abilities.¹ In rodents, for example, the sex differ-

ence favoring males on spatial mazes is increased or found only in the breeding season. Variations in complex motor behaviors have been found across the estrous cycle in female rodents. Such findings in other species suggest that there may be variations in cognitive or motor functions in humans as well, as hormone levels fluctuate.

In fact, there is now substantial evidence that cognitive patterns may vary with phases of the menstrual cycle in normally cycling women and with seasonal variations in androgens in men. We review some of the evidence here.

There is some controversy in the current literature as to the size and extent of sex differences in cognitive abilities.² Nevertheless, numerous studies have reported a sex difference in favor of women on tests of verbal fluency, verbal articulation, perceptual speed and accuracy, and fine distal motor movements. A reliable sex difference in favor of men has been reported on tasks involving spatial rotation and manipulation, appreciation of the vertical, and mathematical reasoning.³ Neutral tasks (those on which there are no sex differences) include general in-

telligence measures such as vocabulary tests, as well as verbal and nonverbal reasoning tests. Because animal studies show that it is primarily sexually differentiated behaviors that are subject to the effects of gonadal hormones, it was from among these groupings that we selected tests for our studies. Numerous sources of variance, including genetic and experiential factors, contribute to an individual's proficiency within a specific cognitive domain, but in these studies our focus was on the extent to which transient hormonal factors might affect performance.

CHANGES ACROSS THE MENSTRUAL CYCLE

The menstrual cycle provides a convenient natural paradigm for investigating variations in estrogen and progesterone. Studies have shown that well-learned tasks and tasks that require a mixture of different abilities do not vary systematically over the menstrual cycle.⁴ Yet certain sexually dimorphic cognitive functions may nevertheless be influenced by the hormonal milieu. The observed pattern of changes does not conform to popular stereotypes: In our studies, we found a reciprocal pattern of changes between spatial ability and a number of skills reported to show a female advantage. Our studies differ from many previous studies of the menstrual cycle in two important respects: We specifi-

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cally studied cognitive abilities that show reliable sex differences, and we compared phases of the menstrual cycle in which circulating concentrations of estradiol (a potent form of estrogen), or estradiol and progesterone, are maximal or minimal. It may be primarily for these reasons that subtle changes in cognitive performance became apparent in our studies. Although some earlier researchers had reported findings similar to ours, many other prior studies were methodologically flawed and noncontributory.⁴

In our first two studies,⁵ young women were tested twice, in counterbalanced fashion, so that the test sessions coincided once with the midluteal phase of each woman's cycle (when estrogen and progesterone levels are high) and once with the late menstrual phase of each woman's cycle (when levels of both hormones are very low). Subjects were unaware of the hypotheses being tested. In the first study, using a within-subjects design comparing the two phases, we found that women performed better on tests of

manual dexterity, known to favor females, but more poorly on a perceptual-spatial task (the rod-and-frame test), known to favor males, during the midluteal phase of the cycle. This was the first piece of evidence that high levels of ovarian hormones may facilitate certain skills that show a female advantage, while being detrimental to skills that show a male advantage. The second study employed a broader battery of sexually dimorphic tasks. Tests of verbal and articulatory skills, manual dexterity, and perceptual speed, as well as a broader sampling of visuospatial measures, were included. We chose tests with objective scoring to minimize any possibility of experimenter bias. The statistical analyses focused on composite measures reflecting general performance on each ability, rather than on individual test scores per se. Within-subjects comparisons showed that women performed slightly better on tests of verbal fluency, manual dexterity, speeded articulation, and to some extent perceptual speed when levels of estrogen and progesterone were

presumed to be higher than when they were lower. Some problems were encountered with practice effects on the spatial tasks; nevertheless, on first exposure to the tests, women at the menstrual phase outperformed women at the midluteal phase, confirming our earlier results.

In both of these studies, estrogen and progesterone varied in parallel (see Fig. 1), so it was not possible to infer which hormone was more closely related to the cognitive fluctuations observed. To help tease this relationship out, we conducted another study.⁷ This time, women's menstrual phase performance was compared with their performance a day or two before ovulation, when estradiol levels are extremely high, but progesterone levels are still relatively low. Because this brief phase is difficult to identify accurately from menstrual records alone, serum levels of estradiol, progesterone, and luteinizing hormone were measured for each woman via radioimmunoassay. Once again, we found significantly better performance on tests of manual and articulatory speed and accuracy at higher estrogen levels, and poorer performance on tests of visuospatial ability at this time. This was so despite the fact that on a mood questionnaire administered during the test sessions, women reported enhanced feelings of vigor and positive affect at the preovulatory phase. This study, then, provided further confirmatory evidence for cognitive fluctuations across the menstrual cycle, at least among some sexually differentiated skills, and again revealed reciprocal changes among abilities that show sex differences favoring males versus females. Although the pattern was not identical to that seen in our earlier studies, high levels of estradiol alone did appear to be associated with variation in motor and visuospatial skills.

Other laboratories have begun to confirm our results.⁸ For example, Irwin Silverman and his colleagues

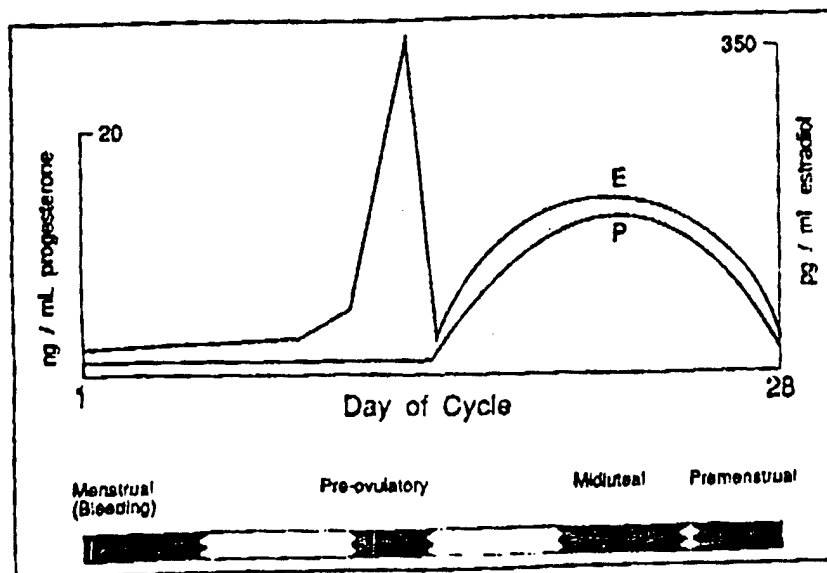


Fig. 1. Schematic representation of changes in serum concentrations of estradiol (E) and progesterone (P) across the menstrual cycle. Tasks on which women excel tend to be enhanced in the high-E and high-E-and-P phases, relative to the low phase; spatial tasks on which men excel show the reverse pattern. Note that E and P concentrations are shown on separate scales. Modified from Ganong.⁶

at York University have replicated some of our findings using a different spatial measure, the Vandenberg and Kuse Mental Rotations test (Fig. 2). In Silverman's study, women showed significantly better spatial performance during the menstrual phase of the cycle, compared with their performance during the early luteal phase, a part of the cycle characterized by relatively high estrogen and progesterone levels. More recently, Phillips and Sherwin reported a slight menstrual-phase decrease in women's scores on a test involving memory for designs. This type of visual memory shows a small female advantage, so this finding is consistent with our data. It also serves to emphasize that it is the demand for spatial transformations, not the presence of pictorial material per se, that is the key element behind the observed menstrual-phase enhancement on spatial tasks.

PHASES OF HORMONE REPLACEMENT THERAPY IN POSTMENOPAUSAL WOMEN

Menstrual cycle studies by their very nature are correlational. One must therefore ask whether fluctuations in cognitive function are truly a

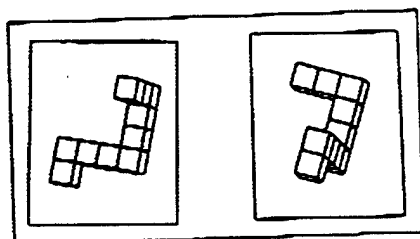


Fig. 2. Example of a spatial rotation task. The subject must determine if the two figures are rotated versions of each other or not. This type of task is performed better by women in the low-estrogen-and-progesterone phase of the menstrual cycle (i.e., during menstruation) than during higher E and P phases. It is performed better by men in spring, when testosterone levels are relatively low, than in fall. On average, men perform better than women, but between-sex effect sizes are larger in spring than in fall.

direct consequence of hormonal variation or, for example, the influence of some independent pacemaker within the central nervous system. Evidence from postmenopausal women undergoing hormone replacement therapy suggests that hormonal variation is sufficient to produce at least part of the changes. Because such therapy is given on a calendar-month basis, it is random with respect to any residual biorhythms that postmenopausal women might have.

Our postmenopausal subjects were on a monthly therapy regime whereby they received estrogen for 16 or 25 days at the beginning of the month. A minority of the women had progesterone added from Day 16 through Day 25. All women went off all therapy from Day 26 to the end of the calendar month. They were tested twice, in counterbalanced order, once between Days 10 and 15, in the estrogen-alone phase, and once at least 4 days after going off all therapy.

We found that postmenopausal subjects performed better in the estrogen phase than in the off-therapy phase on a manual sequencing task and on an articulatory task, as well as on one perceptual speed test.⁹ There were no effects on either a two-dimensional rotation task or a disembedding task. The latter two tasks are less sensitive to sex differences than other, more demanding spatial tests, which might account for the lack of effect of hormone therapy status. It also appears that hormone therapy results in estrogens being dissipated less rapidly than occurs during the natural menstrual cycle, in that levels of estrogen higher than pretreatment levels can be detected for several weeks after cessation of therapy. This might mean that the difference between phases of therapy was attenuated compared with the difference across phases of the menstrual cycle. Even so, the effect on motor and articulatory abilities was significant, suggesting that

such tasks may be more sensitive to fluctuations in estrogen than are spatial tasks, at least in older women.

SEASONAL FLUCTUATIONS IN COGNITIVE PATTERNS IN MEN

Hormone-related fluctuations in cognitive function are not limited to women: We have found seasonal differences in cognitive performance in men, seemingly related to variation in testosterone levels. Previous research had shown that normal male undergraduate students with testosterone levels below the median performed better on spatial tests than did those with levels above the median.¹⁰ Such studies suggest that there is some optimum level of testosterone for spatial ability, and that this level is above the level of the average female but below the level of the average male. It is also known that, at least in the northern hemisphere, testosterone levels are higher in men in autumn than in spring, presumably an evolutionary remnant related to optimal mating and offspring production times. If lower testosterone levels within the normal range are associated with better spatial ability, one might expect men's scores on spatial tasks to be higher in spring than in fall. This indeed turned out to be the case.¹¹

Three examples each of three kinds of tests were administered: (a) The "neutral" tests—those not showing sex differences—were Advanced Vocabulary, Inferences, and a modified Raven's Progressive Matrices; (b) the "masculine" tasks—those on which males typically excel—were Hidden Figures, Paper-folding, and Mental Rotations; (c) the "feminine" tasks—those on which females typically excel—were two perceptual speed tests, Finding A's and Identical Pictures, and a test of divergent thinking, the Thing Categories test.

To facilitate comparison across tests with different maxima, all scores were converted to standard scores, and a composite for each of the three types of tests (neutral, masculine, feminine) was derived. Testosterone levels were measured by salivary radioimmunoassay.

Thirty-six men and 34 women were seen in fall, and 34 men and 34 women were seen in spring. (Only across-subjects data are reported here because within-subjects data collection is in progress.) A multivariate analysis of variance was performed across the three composite scores (neutral, masculine, feminine), two sexes (male, female), and two seasons (spring, fall). The expected sex differences on masculine and feminine tests were found. In addition, there was a significant Sex

\times Season \times Test-Type interaction ($p = .004$). A breakdown of the data showed a significant sex-by-season interaction only for the masculine composite. Further breakdown indicated that the seasonal effect was significant only in males ($p = .047$), not in females ($p = .326$). As Figure 3 shows, men performed better on the masculine composite in spring, as predicted.

This finding, coupled with the data on cognitive function across the menstrual cycle, suggests that a significant amount of the variation in the size of sex differences from study to study may be related to season or menstrual phase. Nevertheless, although seasonal effects alter the size of the sex difference, they do not obliterate that difference. Male superiority on mental rotation, for ex-

ample, is still evident in fall ($p < .03$), although the effect size is substantially larger in spring (.89) than in fall (.46).

Again, one might ask whether it is actually the hormonal changes, confirmed by radioimmunoassay in our study, that are the basis for variation in cognitive function. A general change in intellect or mood is unlikely to be the basis for these seasonal differences in men because the effects are restricted to spatial tasks. Only scores on masculine tests have so far been related to levels of testosterone across individuals,¹⁰ further making it probable that changes in testosterone levels are indeed the critical factor. A recent study by Janowsky and co-workers¹² strengthens this interpretation. Administration of testosterone to older men (whose endogenous testosterone levels would be below those of the young males we studied, and thus below the hypothetical optimum) enhanced performance on a spatial-constructural task, but not on verbal or motor tasks.

CONCLUDING COMMENTS

Cognitive pattern fluctuates with variations in sex steroid levels in both men and women, whether the levels vary spontaneously or by means of exogenous therapy. In our studies, variations in estrogen in women relate to performance on both masculine and feminine tests, but variations in testosterone in men appear to relate only to masculine tests. We do not, however, know what concomitant changes in other steroid hormones may be occurring when testosterone varies because, for example, assays of estrogen have not typically been done in the same subjects.

Our findings of hormone-sensitive fluctuations in cognition, combined with data from other research-

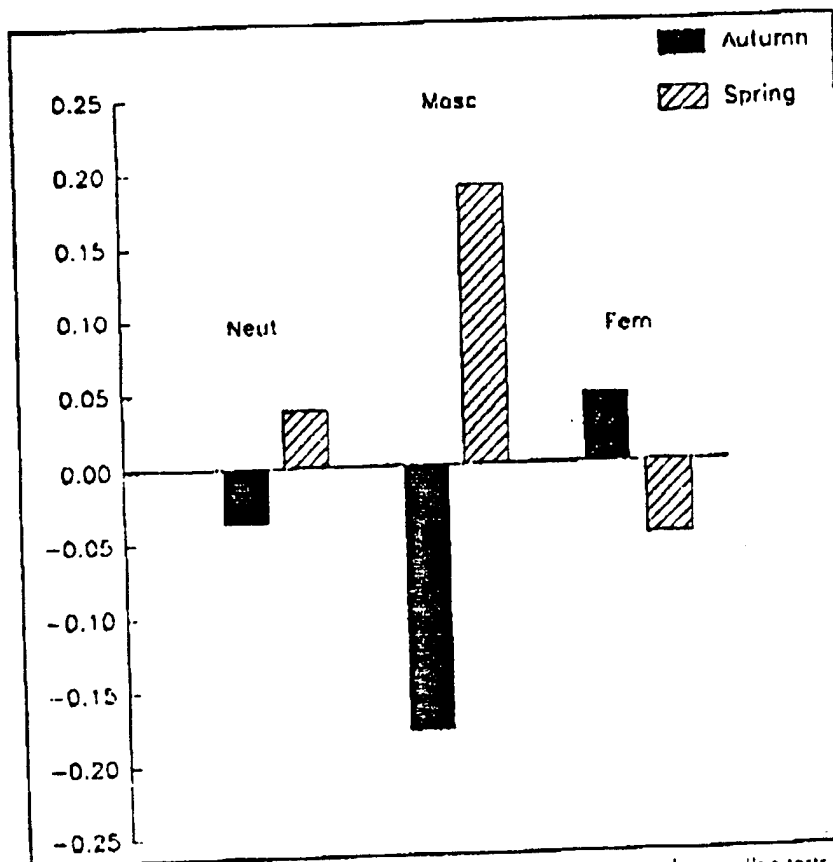


Fig. 3. Standard composite scores in men on neutral, feminine, and masculine tests in spring and fall. Performance on masculine (spatial) tests varies significantly with the season in young men.

ers suggesting early organizational effects of sex steroids on the mammalian brain,¹³ imply that the group differences between men and women in some specific cognitive abilities are to a significant degree a product not only of current but also of early hormonal environments. This hypothesis is consistent with animal work showing that sexually dimorphic behaviors that are subject to early organizational influences often continue to be sensitive to the effects of sex hormones in adulthood.

Whether fluctuations in cognitive pattern are merely epiphenomena or serve some adaptive function is unclear. Conceivably, it may have been useful for men's spatial ability to be enhanced in spring in nomadic hunter-gatherer societies, when the home camp might be relocated, or hunting might be more intensive; but it is unclear what advantage could accrue from changes in cognitive skills across the menstrual cycle. Nevertheless, the existence of seasonal and monthly fluctuations in cognitive function suggests that these are potentially significant variables in determining the size of sex differences seen across various research studies.

It is also unknown at this point what the precise neural mechanisms producing the changes in cognitive function might be. There appear to be alterations in some aspects of functional hemispheric asymmetry across the menstrual cycle, as indicated by enhanced right-ear superiorities on a dichotic listening test in

the high-estrogen phases.⁷ It is unlikely, however, that relative hemispheric activation is the only or the fundamental mechanism for cognitive changes. Animal studies suggest that fluctuations in steroid hormones can have a variety of effects on neurochemistry, modulating neurotransmitters in widespread areas of the brain and even inducing transient structural changes, such as changes in synapse density in some regions. Hormonal and cognitive studies in humans need to be combined with measures of neural activity to address this issue.

Acknowledgments—The authors' research was supported by grants from the Medical Research Council, Ottawa, Canada.

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Daniel S. Weiss, Ph.D.

With a Chapter by
David A. Grady, Psy.D.

FOREWORD BY SENATOR ALAN CRANSTON



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CHAPTER IV

Evidence of Post-Traumatic Stress Disorder

COMMENTARY

J.S., a Hispanic male veteran, married for more than 20 years with three children, experienced high sustained war-zone-stress exposure; he walked point, was frequently under fire, and was wounded in combat. He began drinking heavily while in Vietnam, has required treatment for alcohol-related internal medical problems, and alcohol remains a serious problem for him today.

T.L., a 38-year-old Black veteran, described his experience in Vietnam this way: "Every time I turned around someone was getting shot, or had a limb blown off, or their guts hanging out. There was nothing you could do for them." From 1970 to the present he has been troubled by the typical symptoms of post-traumatic stress disorder: "Sometimes my thoughts take me right back to what happened to the guys there. I wish I could have helped them." He has attempted to deal with his searing feelings of guilt over having survived while others died and his nightmares of combat through chronic substance abuse. He has had no medical treatment for almost two years and has never sought help from the Veterans Administration.

These cases are clear indications of the profound and long-lasting disruptions that PTSD can bring to the lives of returning veterans. Their plight raises urgent public policy questions. How many Vietnam veterans have developed PTSD at some time since the war? Of those who developed the disorder, how many still have it today? Did it make a difference if you were White, Black, or Hispanic, male or female, saw heavy or limited combat exposure, were younger or older at the time of entering service, or whether you volunteered or were drafted? These and other fundamental questions are addressed in this chapter.

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CHAPTER I Methods for

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This national survey was designed to make the most accurate possible determination of the percent of Vietnam veterans who have PTSD. Two separate studies were undertaken to arrive at the best set of measures for making this determination, the first conducted before the household survey and the second concurrently with it. Because no single structured interview or scale exists to serve as a gold standard for PTSD diagnosis, multiple diagnostic indicators were used. A subsample of the household survey respondents was reinterviewed by expert clinicians and received a structured diagnostic interview, four scales completed by the clinician, five self-report questionnaires, and spouse/partner scales. A composite diagnosis was arrived at by determining the pattern of agreement across the major indicators. The correspondence of this composite diagnosis in the clinical subsample with PTSD measures in the survey was then determined.

Two types of PTSD prevalence were determined; full PTSD syndrome and partial PTSD, the latter reserved for veterans who suffer from many of the core symptoms of PTSD, whose lives are disrupted, who appear to be in urgent need of treatment, but who do not have all the features necessary to receive the full syndrome diagnosis. We also determined what proportion of those with either the full or partial syndrome have recovered with time versus those more deeply afflicted whose anguish has been unrelenting.

The results are striking. A disturbingly large proportion of Vietnam theater veterans have PTSD today. For many who developed the disorder two decades ago, time has not brought relief, and problems compound in work and interpersonal functioning. For those whose nightmares, flashbacks, and startle reactions are as intense today as they were on their return, the war is not over. Only the scene of the battlefield has shifted—from the outer to the inner world.

CHAPTER OVERVIEW

Methods for Estimating PTSD Prevalence

To increase the accuracy of the NVVRS estimates of PTSD prevalence, we included multiple PTSD measures in the study. This approach was taken in acknowledgment of the fact that no single PTSD assessment is completely

error-free. Therefore, instead of relying on a single PTSD assessment, current PTSD diagnoses in the NVVRS were made on the basis of information from a number of indicators. The PTSD diagnosis based on information from multiple indicators is called the *composite* diagnosis. It is the convergence of information across PTSD indicators, and the cross-measure confirmation of the diagnosis that results from a multimeasure "triangulation" approach, that provides the foundation for the credibility of the NVVRS PTSD prevalence estimates. This "multimeasure triangulation approach" did not specify a positive diagnosis if only one of the measures suggested the presence of PTSD, a strategy sometimes employed when multiple measures are used. Rather, under the procedure employed by the NVVRS, a conflict among multiple measures might lead to either a "negative" or a "positive" diagnosis, depending on the preponderance of evidence.

By definition, a prevalence rate is the percent of a specified population group or subgroup that has a given disorder during a specified period. To address more completely the "service needs assessment" aspect of the Congressional mandate, we decided to present prevalence estimates for two "types" of PTSD: the full PTSD syndrome (as defined by DSM-III-R) and "partial" PTSD. Estimates of the prevalence of "partial" PTSD are estimates of the percent whose stress-reaction symptoms are of either insufficient intensity or breadth to qualify as the full PTSD syndrome, but may still warrant professional attention. People with partial PTSD today may have had a full syndrome in the past that is currently in partial remission, or they may have never met the full criteria for the disorder. Nevertheless, they do have clinically significant stress-reaction symptoms and might benefit from treatment. Thus, they represent an additional component of the total spectrum of potential "need for treatment."

PTSD Prevalence Estimates

An estimated 15.2 percent of all male theater veterans are current cases of PTSD. This represents about 479,000 of the estimated 3.14 million men who served in the Vietnam theater. Among female Vietnam theater veterans, current prevalence is estimated to be 8.5 percent of the estimated 7,166 women who served, or about 610 current cases.

Also for both sexes, current PTSD prevalence rates for theater veterans are consistently higher than rates for comparable era veterans (2.5 percent male, 1.1 percent female) or civilian counterparts (1.2 percent male, 0.3 percent female). These differences are even more striking when Vietnam era veterans and civilians are compared with the subgroup of Vietnam theater veterans exposed to high levels of war-zone stress. Rates of PTSD

Evidence of PTSD

among the late theater veterans

Among theater veterans, 15.2 percent among male and 8.5 percent among female theater veterans and civilian counterparts: the prevalence rates for theater veterans or civilian counterparts.

Additionally, the prevalence of partial PTSD is 11.7 percent among male theater veterans—in addition to those who have had treatment.

NVVRS findings show that the lifetime prevalence of PTSD among theater veterans is 22.5 percent, a finding that means that 22.5 percent of the theater veterans = 48.1 percent of the theater veterans have significant stress-reaction symptoms.

A comparison of the prevalence of PTSD among theater veterans that about one-third (31.6 percent) of theater veterans with PTSD still have significant stress-reaction symptoms (49.3 percent) of theater veterans today. These findings suggest that PTSD is a chronic, rather than an acute, condition.

Distribution of PTSD

Having established the prevalence of PTSD among theater veterans, we then identify characteristics of theater veterans with PTSD. The distribution of PTSD among theater veterans by age, sex, and service location is presented in Table 1. The distribution of PTSD among theater veterans by age, sex, and service location is presented in Table 1.

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among the latter are dramatically higher than those observed among theater veterans exposed to low or moderate levels of war-zone stress.

Among theater veteran males, the current PTSD prevalence rate is 27.9 percent among Hispanics, 20.6 percent among Blacks, and 13.7 percent among White/others. Differences among theater veterans, era veterans, and civilian counterparts are also observed within the three race/ethnicity subgroups: theater veteran rates are consistently higher than rates for era veterans or civilians.

Additionally, NVVRS findings indicate that the *current* prevalence of *partial* PTSD is 11.1 percent among male theater veterans and 7.8 percent among female theater veterans. Together, this represents about 350,000 veterans—in addition to the 480,000 with the full PTSD syndrome today—who have trauma-related symptoms that may benefit from professional treatment.

NVVRS findings indicate that the *lifetime* prevalence of PTSD is 30.9 percent among male theater veterans and 26.9 percent among females. The *lifetime* prevalence of *partial* PTSD among male theater veterans is 22.5 percent, and among female theater veterans 21.2 percent. These findings mean that over the course of their lives, more than half ($30.9 + 22.5 = 53.4$ percent) of male theater veterans and nearly half ($26.9 + 21.2 = 48.1$ percent) of female theater veterans have experienced clinically significant stress-reaction symptoms. This represents about 1.7 million veterans of the Vietnam war.

A comparison of the current and lifetime PTSD prevalence rates shows that about one-half (49.2 percent) of the male theater veterans and one-third (31.6 percent) of the female theater veterans who have ever had PTSD still have it today. Also, of those theater veterans who have ever had significant stress-reaction symptoms (full or partial PTSD), about half (49.3 percent) of males and one-third (33.9 percent) of females are experiencing some degree of clinically significant stress-reaction symptoms today. These findings are consistent with the conceptualization of PTSD as a chronic, rather than acute, disorder.

Distribution of PTSD Among Vietnam Theater Veterans

Having established the prevalence of PTSD among the major study groups, we then conducted a series of *descriptive analyses designed to* identify characteristics associated with higher current PTSD prevalence among theater veterans. These analyses help to clarify who among theater veterans has PTSD today. We present here a general summary of the distribution of PTSD according to a selected group of background characteristics, characteristics of military service and service in Vietnam,

and current sociodemographic characteristics. We have summarized the findings separately for men and women.

MALE THEATER VETERANS. Men who served in the Army (16.2 percent) or Marine Corps (24.8 percent) are considerably more likely than those who served in the other branches of the Armed Forces to have PTSD today. Across the services, one in four of those who served in the junior enlisted pay grades (E1-E3) currently have PTSD. By far the lowest rate of PTSD is among those who served on active duty 20 or more years (5.6 percent), while those who served more than four but less than 20 years have the highest rate (24.8 percent).

Somewhat surprisingly, the particular period during which male theater veterans served in Vietnam (for example, during the 1968 Tet offensive) is not strongly related to variation in current rates of PTSD. In contrast, age at entry to Vietnam clearly is. Those who were 17-19 years of age when they first entered Vietnam are much more likely to have current PTSD (25.2 percent) than those who were older at the time of entry. Those who served in Vietnam 13 months (the conventional tour of duty for Marines) or longer are also more likely to meet criteria for current PTSD (19-20 percent) than those who served 12 months or less (12.7-15.3 percent).

In addition to length of service, the nature of Vietnam service also appeared to exert a major influence on the prevalence of current PTSD. For example, among those who served in I Corps (the military region in which the Marine Corps was predominant), the current prevalence of PTSD is 22.5 percent. Similarly, those who were wounded or injured in combat are two to three times as likely to have current PTSD, and the likelihood of having current PTSD is also greater for those who received a Purple Heart (over one-third) or any other combat medal (almost one in four).

In addition, several characteristics of veterans' current lives are related to the prevalence of PTSD today. Its prevalence is higher among theater veteran men who are currently separated or living with someone as though they were married. The rate of disorder is also higher among those who never finished high school (28.7 percent), those who are currently unemployed (34.5 percent), and those who have incomes of less than \$20,000 per year (26.2 percent). Conversely, rates of current PTSD are particularly low among those who are currently married, are college graduates, are employed or retired, and have incomes of \$30,000 or higher. The prevalence rate is also higher than average for men who reside in the West (23.3) and in very large or medium-sized cities (24.8 and 21.2 percent respectively). Comparisons by current religious preference sug-

gest that men who declare no religious preference are those at highest risk for current PTSD.

FEMALE THEATER VETERANS. Fewer characteristics are associated with an increased prevalence of PTSD among Vietnam theater veteran women than among men. This may reflect the greater homogeneity of this subgroup, in that most were nurses. The small sample size prohibited comparisons by race and ethnicity, but comparisons by year of birth revealed that women born before 1940 have PTSD rates under 5 percent, whereas those born during the 1940s (1940-1949) have essentially twice that rate (approximately 10 percent).

There was also little variation in current PTSD rates among women by type of entry to military service, branch of service, or service in the Reserve or National Guard. However, as with men, those who served on active duty more than 20 years have especially low rates of the disorder, whereas those serving four to 19 years have somewhat elevated rates. Interestingly, women who served in the junior officer pay grades (O1-O3) have almost twice the rate of current PTSD as the more senior officers (O4-O6).

As was the case for men, there was little variation for women in PTSD prevalence by year of entry to Vietnam, but also no substantial differences by age at entry or length of service. However, those who served in I Corps and II Corps have higher rates of PTSD today than those who served elsewhere. As was also true for men, women exposed to high levels of war-zone stress, such as exposure to the wounded and dead, have seven times the rate of current PTSD as those with low or moderate levels of exposure.

Women who are divorced, separated, or living as married also have substantially higher rates of PTSD than those who are married, and, unlike the findings for men, the prevalence of current PTSD is higher among female theater veterans with some college (11 percent) or post-graduate training (10 percent) than among high school or college graduates (3.8 and 6.4 percent respectively). The prevalence of current PTSD is also higher among theater veteran women with incomes of less than \$20,000 per year (10.4 percent), those who currently reside in the West (14.7 percent) or in medium-sized cities (14.3 percent), and those who state no religious preference (26.8 percent).

WORK TO IDENTIFY CURRENT PTSD CLIENTS

Reflecting the emphasis on PTSD in the Congressional mandate, our research team wanted to create a research design for the Readjustment

Study that would maximize the accuracy of the study's estimate of the prevalence of PTSD among Vietnam theater veterans. This concern was expressed through two important features of the NNVRS design. First, when the NNVRS was being planned, the American Psychiatric Association (APA) was in the process of revising its *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III), the document that provides the "official" definition of psychiatric disorders in the United States. To assure that the NNVRS assessment of PTSD was consistent with the official definition of PTSD that would be in place when the NNVRS findings became available, the research team coordinated its efforts with the group working on revising the psychiatric taxonomy, APA's Work Group to Revise DSM-III. RTI cosponsored the meeting of the Ad Hoc Panel on the Definition and Measurement of PTSD, whose recommendations for revising the diagnostic criteria for PTSD were incorporated into the revised PTSD definition. As a result of this coordination, the NNVRS clinical estimates of PTSD prevalence are estimates of the prevalence of the disorder as defined in the current official taxonomy (and, therefore, in use by the VA system).

Second, the bedrock of the accuracy of any diagnostic procedure is its validity—that is, the extent to which the procedure classifies individuals in whom the disorder is truly present as "cases" and those in whom the disorder is truly absent as "noncases." To achieve the objective of diagnostic accuracy, RTI proposed a double validation design that involved conducting a preliminary validation study before launching the national survey (that is, the NSVG), and then conducting a second validation study to run concurrently with the national survey. In the following sections, we summarize the nature and purposes of these validation components and the methods for integrating validation study findings with those of the national survey to formulate population prevalence estimates. (Full methodological details are provided in Volume II, Appendices D and E.)

Preliminary Efforts

One of the fundamental principles on which RTI's original proposal to conduct the NNVRS was founded was that the national survey component of the study should not go to the field until sufficient evidence existed that cases of PTSD could be validly identified on the basis of survey interview information. This restriction was critical because no published information existed concerning the validity of any of the existing survey instruments used to identify PTSD in earlier research.

Therefore, the NNVRS design called for a preliminary study to examine

the ability of several candidate survey measures to discriminate "true" cases of PTSD from "true" noncases. This validation study involved administering a package of candidate PTSD instruments to a group of subjects whose diagnostic status was known. The diagnostic status of subjects, who were mostly veterans undergoing psychiatric treatment, was "known" because their chart diagnosis and the diagnosis made by an expert clinician agreed on the presence or absence of PTSD. The expert clinician's diagnosis was made on the basis of an independent diagnostic interview conducted blind to the chart diagnosis.

Results of the study indicated that several instruments in the package could classify people as cases or noncases of PTSD with acceptable accuracy. These findings served as the basis for decisions about the package of instruments to be included in the NSVG (Appendix D details the design and findings of the preliminary validation study).

A Pool of Clients

The preliminary validation study provided information suggesting that we could proceed with the national survey component of the NNVRS. However, it did not (and we did not intend it to) provide complete information about every aspect of the validity of the survey-based PTSD measures. For example, the validation study's subjects were (of necessity) people who had sought treatment for their mental health problems, and evidence in the research literature suggests that people who seek mental health treatment are different in many ways from people who do not seek treatment for a psychiatric disorder but who do not seek treatment for it. Because the national component of the NNVRS involved a community sample rather than a treatment-seeking sample, the relationship between the diagnostic measures and "true" diagnosis (that is, the validity of those measures) could be expected to be at least somewhat attenuated from the estimate made on the basis of a treatment-seeking population.

For this reason the NNVRS design contained a clinical subsample component. The primary purpose of the clinical subsample component was to provide additional information about the correspondence between PTSD measures included in the survey interview and "true" PTSD. The clinical subsample was designed as a multimethod validity study, in which multiple PTSD measures, including a semistructured interview conducted by an experienced mental health professional, could be brought to bear on the diagnostic decision. Thus, we planned a "triangulation" method for PTSD case identification, in which the diagnostic decision

process would take into account information collected through a variety of methods and from a variety of sources.

Each clinical subsample respondent underwent a semistructured clinical interview that resulted in a diagnostic decision about PTSD. In addition, the clinician who conducted the interview completed several clinical scales describing his or her clinical impression of the respondent, and the respondent completed several self-report PTSD scales. In addition, the spouse/partner (if the respondent had one) of each clinical subsample respondent was also interviewed. As a result, the research team had at its disposal five self-report scales directly related to PTSD (plus a number of other psychiatric symptom scales related to PTSD but less directly so) and four clinical judgment scales, for clinical subsample respondents. This information base is what we used to make PTSD case determinations.

Identifying in Clients

Although the research team has great confidence in a PTSD diagnosis made by a trained and experienced mental health professional based on a thorough clinical interview, we also recognize that no diagnostic procedure is completely error-free. Therefore, we sought to use information from the full range of PTSD indicators available in the clinical subsample to form a "composite" PTSD diagnosis. The basic idea of the composite diagnosis was to examine the information available from multiple PTSD indicators, including but not limited to the clinical interviewer's diagnosis. In addition, in those cases where some discrepancy among the indicators existed, we used the full array of additional PTSD information to make a diagnostic decision.

Simply stated, composite diagnoses were made on the basis of a detailed review of the PTSD information for each individual clinical subsample subject. Review began by examining the study's three main indicators:

- the Mississippi Combat-Related PTSD (M-PTSD) scale
- the Clinical Interview (SCID) PTSD diagnosis
- the PTSD scale of the Minnesota Multiphasic Personality Inventory (MMPI)

When these three indicators agreed, the diagnosis was considered "settled" (decided). In the event of a discrepancy in PTSD diagnosis among the three indicators, we used information from the study's other PTSD indicators to resolve the discrepancy. We combined information from these other indicators statistically to create two additional main indicators for use in resolving discrepancies. (Details of the logic underlying the composite diagnosis procedure and of its relationship to other potential

methods of case determination are discussed in Appendix D.) Application of this procedure resulted in a composite PTSD diagnosis for every subject in the clinical subsample. PTSD prevalence estimates presented in the following sections are based on the composite PTSD diagnosis (details of the procedure by which NVVRS prevalence estimates were formulated are presented in Appendix E).

NATIONAL ESTIMATES OF PTSD

By definition, a prevalence rate is the percent of a specified population group or subgroup that has a given disorder during a specified period. To address more completely the "service needs assessment" aspect of the Congressional mandate, we decided to present prevalence estimates for two "types" of PTSD: the full PTSD syndrome (as defined by DSM-III-R) and "partial" PTSD. Estimates of the prevalence of "partial" PTSD are estimates of the percent whose stress-reaction symptoms are of either insufficient intensity or breadth to qualify as the full PTSD syndrome but still warrant professional attention. People with partial PTSD today may have had a full syndrome in the past that is currently in partial remission, or they may have never met the full criteria. Nevertheless, they do have clinically significant stress-reaction symptoms that could benefit from treatment, and they represent an important component of the total spectrum of "need for treatment."

We have opted to present in this report prevalence rates with respect to two specific reference periods: *current* prevalence and *lifetime* prevalence. Current PTSD prevalence is operationally defined as the percent of the specified population group or subgroup (for example, male Vietnam theater veterans) who met the criteria for the PTSD diagnosis during the six-month period preceding their participation in the NVVRS. The consensus of clinicians involved in the study was that this rate was the most accurate way to identify those who have the disorder today.

The lifetime prevalence rate, on the other hand, represents the percent of the specified population group or subgroup who have met the diagnostic criteria for the PTSD diagnosis at some time during their lives. Thus the lifetime prevalence rate counts all those who have ever had PTSD whereas the current prevalence counts only those who have PTSD today.

Current and lifetime prevalence rates are reported because they provide two different perspectives on the problem. Given that the Readjustment Study was conducted 15 or more years after most veterans' Vietnam service, the lifetime prevalence rate may be thought of as an index of the "total" PTSD problem: what proportion of the men and women who served in Vietnam ever had PTSD? Current prevalence, on the other hand

provides an index of the magnitude of the problem today. Taken together, lifetime and current prevalence of full and partial PTSD provide a relatively complete picture of the stress-reaction sequelae of exposure to trauma.

Additionally, the ratio of current to lifetime prevalence provides some information about the course of the disorder. A finding that only a small portion of those theater veterans who ever had PTSD have it today would be consistent with the notion of PTSD as a relatively acute, or time-limited, disorder. Alternatively, a finding that a substantial proportion of theater veterans who ever had PTSD still have it today would be more consistent with the view of PTSD as a chronic disorder.

Current PTSD

Table IV-1 (in Volume II) shows the estimated current PTSD prevalence rates for the study's major groups and subgroups. An estimated 15.2 percent of all male theater veterans are current cases of PTSD. This represents about 479,000 of the estimated 3.14 million men who served in the Vietnam theater. Among theater veteran females, the prevalence is estimated to be 8.5 percent of the estimated 7,166 women who served, or about 610 current cases.

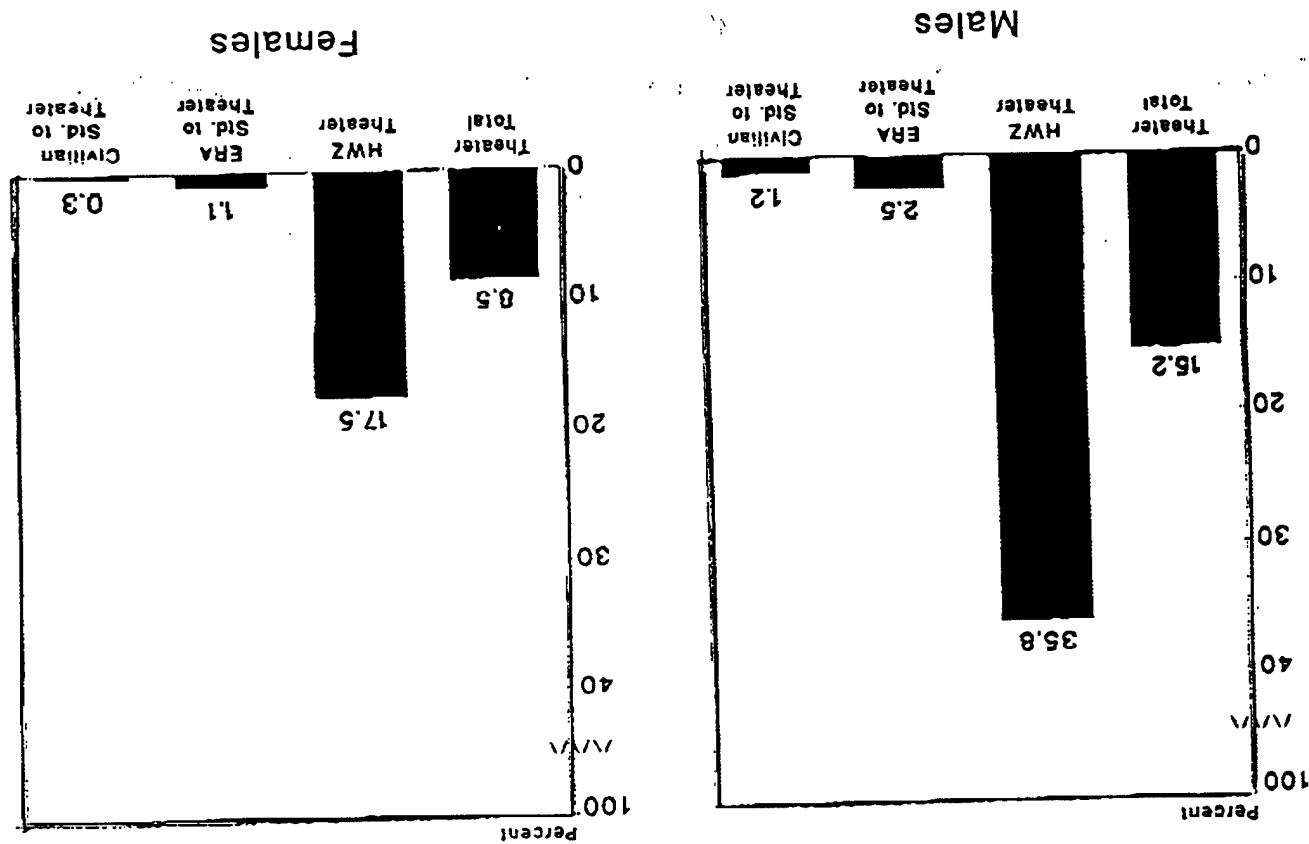
Among both male and female theater veterans, the current PTSD prevalence is:

- higher for those exposed to high levels of war-zone stress than for those with low/moderate stress exposure (a fourfold difference for men and sevenfold for women);
- higher for men who have a service-connected physical disability than for those without such a disability, but not different for women with and without service-connected disability;
- higher for those with a positive lifetime substance abuse diagnosis than for those without (more than a twofold difference for men and nearly a fivefold difference for women).

Also for both sexes, current PTSD prevalence rates for theater veterans are consistently higher than rates for comparable era veterans (2.5 percent male, 1.1 percent female) or civilian counterparts (1.2 percent male, 0.3 percent female). These rate differences become even wider when era veterans and civilians are compared with theater veterans with high war-zone-stress exposure. The current PTSD prevalence findings for the major study groups are shown graphically in Exhibit IV-1.

Among male theater veterans, the current PTSD prevalence rate is 27.9 percent among Hispanics, 20.6 percent among Blacks, and 13.7 percent

EXHIBIT IV-1
Current PTSD Prevalence Estimates for Major Study Groups



among White/others. The relationship between theater veterans, era veterans, and civilian counterparts also holds within the race/ethnicity subgroups: theater veteran rates are consistently higher than rates for era veterans or civilians. The current PTSD prevalence estimates for the male racial/ethnic subgroups are presented graphically in Exhibit IV-2.

The only group or subgroup contrasts of current PTSD rates that do not indicate significant differences are the service-connected physical disability contrasts for female theater veterans. No significant difference exists in

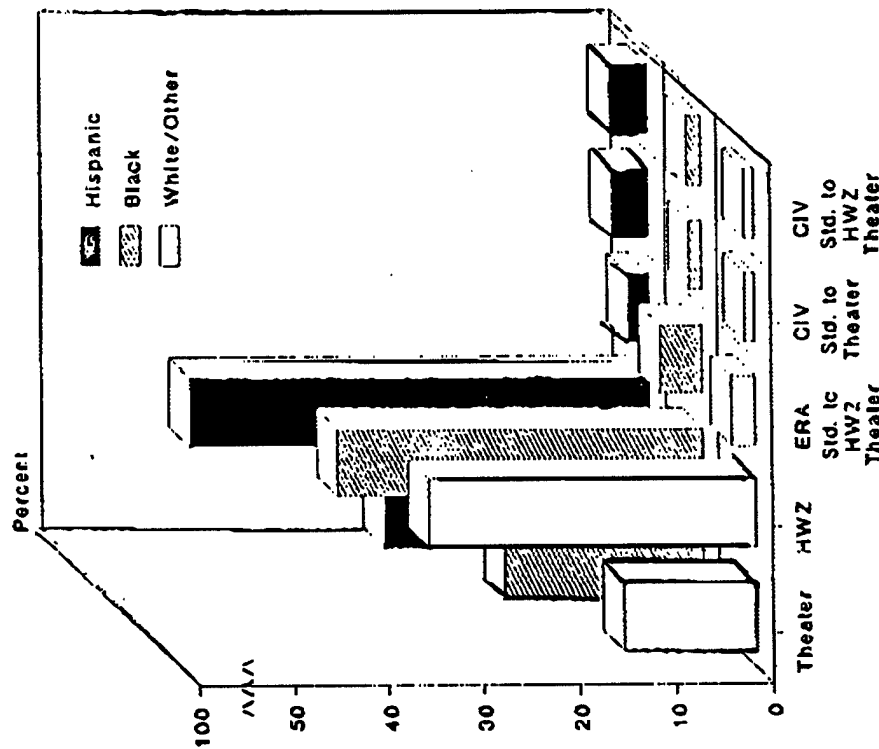


EXHIBIT IV-2
Current PTSD Prevalence Estimates for Racial/Ethnic Subgroups
of Male Theater Veterans

the current PTSD prevalence between female theater veterans with and without service-connected physical disability, or between those with high disability and those with no disability.

Additionally, NVVRS findings indicate that the current prevalence of partial PTSD is 11.1 percent among male theater veterans and 7.8 percent among female theater veterans. Together, this represents about 30,000 veterans—in addition to the 480,000 who have the full PTSD syndrome today—who have trauma-related symptoms that could benefit from professional treatment. The combined findings for the current prevalence of partial PTSD and of the full PTSD syndrome are presented graphically in Exhibit IV-3.

Lifetime PTSD

NVVRS findings indicate that the lifetime prevalence of PTSD is 30.9 percent among male theater veterans and 26.9 percent among females. The lifetime prevalence of partial PTSD among male theater veterans is 22.5 percent, and among female theater veterans 21.2 percent. These findings, also depicted graphically in Exhibit IV-3, mean that over the course of their lives, more than half (30.9 + 22.5 = 53.4 percent) of male theater veterans and nearly half (26.9 + 21.2 = 48.1 percent) of female theater veterans have experienced clinically significant stress-reaction symptoms. This represents about 1.7 million war veterans.

Also presented graphically in Exhibit IV-3 are the findings for the current prevalence of PTSD and partial PTSD. Comparison of the current and lifetime prevalence rates shows that about one-half (49.2 percent) of the male theater veterans and one-third (31.6 percent) of the female theater veterans who have ever had PTSD still have it today. Also, of those theater veterans who have ever had significant stress-reaction symptoms (full or partial PTSD), about half (49.3 percent) of males and about one-third (33.9 percent) of females are experiencing some degree of clinically significant stress-reaction symptoms today. These findings are consistent with the conceptualization of PTSD as a chronic, rather than acute, disorder.

PTSD AMONG VIETNAM WAR VETERANS

Having established the prevalence of PTSD among the major study groups, we conducted a series of descriptive analyses designed to establish potential differences in the distribution of PTSD among Vietnam theater veterans on a broad range of other characteristics. These analyses help to clarify who among theater veterans have PTSD today. These results are

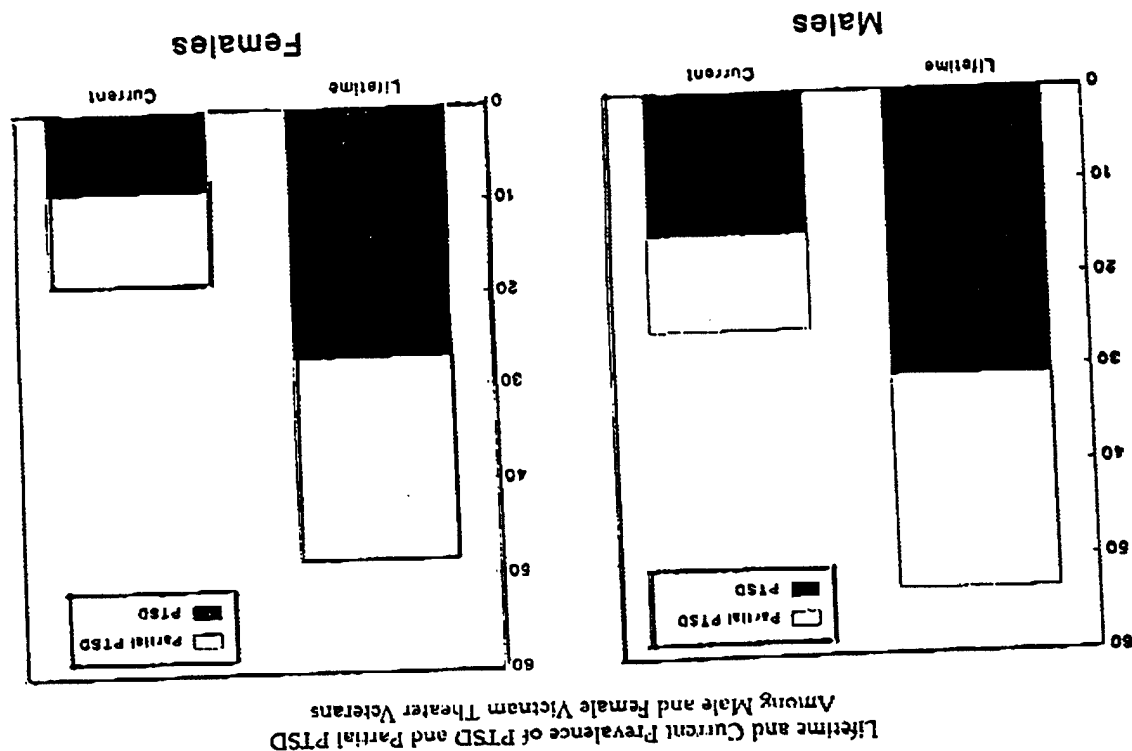
both descriptive and tentative because, although standard errors are provided for all group prevalence estimates, no formal statistical tests of group differences were performed. Nevertheless, as an overall "profile" of the characteristics of Vietnam veterans with PTSD, these analyses are of considerable interest. The full tabulation of these results is presented in Table IV-2 in Volume II. We present here a general summary of the distribution of PTSD according to selected background characteristics, characteristics of military service and service in Vietnam, and some current sociodemographic characteristics. The findings are summarized separately for men and women serving in the Vietnam theater.

Males

BACKGROUND CHARACTERISTICS. As noted earlier in this chapter, PTSD prevalence rates vary considerably by race and ethnicity, with 20.6 percent of Blacks meeting current criteria for PTSD and 27.9 percent of Hispanics, compared with 13.7 percent of White/other men serving in Vietnam. A further breakdown of veterans of Hispanic origin revealed equally high current rates of PTSD among the two primary Hispanic populations in the United States: Mexican Americans and Puerto Ricans.

A notable finding was evident, however, by year of birth, with men born before 1945 having lower current rates of PTSD (4-10 percent) whereas 18-19 percent of those born after 1945 currently have PTSD.

CHARACTERISTICS OF MILITARY SERVICE AND POSTSERVICE. While a substantially lower current PTSD rate was found for those who entered the military other than by induction or enlistment (e.g., direct commission), the sample sizes for these groups were small. Of greater significance, perhaps, was that those who enlisted (either voluntarily or to avoid the draft) have essentially the same rates of current PTSD as draftees and one another. In contrast, men who served in the Army or Marine Corps are considerably more likely than those who served in the other branches of the Armed Forces to have current PTSD (16.2 and 24.8 percent respectively), as were those served in the junior enlisted pay grades (E1-E3), among whom one in four currently has PTSD. By far the lowest rate of PTSD is among those who served on active duty for 20 or more years (5.6 percent), while those who served more than four but less than 20 years have the highest rate (24.8 percent). There were no clear differences in PTSD prevalence among those who had combat duty other than in Vietnam and those who did not, or among those discharged with a "tactical" (e.g.,



Infantry, Armor, Artillery) versus "nontactical" MOS (military occupational specialty).

The prevalence of current PTSD is higher, however, among those male theater veterans who are currently members of veterans' organizations (20.1 percent compared with 12.6 percent for those who have never been members). Similarly, Vietnam veterans who have had at least some contact with the Veterans Administration (VA) after leaving the military have twice the rate of PTSD of those who have not contacted the VA (16.7 versus 8.3 percent respectively).

CHARACTERISTICS OF VIETNAM SERVICE. Somewhat surprisingly, the particular period during which male theater veterans served in Vietnam (for example, during the 1968 Tet offensive) is not related to variation in current rates of PTSD. In contrast, age at entry to Vietnam is. Those who were 17-19 years of age when they first entered Vietnam are much more likely to have current PTSD (25.2 percent) than those who were older at the time of entry. Those who served in Vietnam for 13 months (the conventional tour of duty for Marines) or longer are also more likely to meet the criteria for current PTSD (19-20 percent) than those who served 12 months or less (12.7-15.3 percent).

In addition to length of service, the nature of Vietnam service also appeared to exert a major influence on the prevalence of current PTSD. For example, among those who served in I Corps (the military region in which the Marine Corps was predominant), the current prevalence of PTSD is 22.5 percent. A more obvious example of the importance of the nature of Vietnam experiences—degree of exposure to combat and other war-zone stressors—has already been noted earlier in this chapter. Male theater veterans with high exposure to war-zone stressors are more than four times as likely to suffer from PTSD today as are those with low or moderate exposure. Similarly, those who were wounded or injured in combat are two to three times as likely to have current PTSD, and the likelihood of having current PTSD is also greater for those receiving a Purple Heart (over one-third) or any combat medal (almost one in four).

CURRENT SOCIODEMOGRAPHIC CHARACTERISTICS. There are also several current characteristics of veterans that are related to the current prevalence of PTSD. The prevalence of PTSD is higher among theater veteran men who are separated or living with someone as though they were married. The rate of disorder is also higher among those who never finished high school (28.7 percent), those who are unemployed (34.5

percent), and those who have incomes of less than \$20,000 per year (26.2 percent). Conversely, rates of current PTSD are particularly low among those who are married, are college graduates, are employed or retired, and have incomes of \$30,000 or higher. The prevalence rate is also higher than average for men who reside in the West (23.3) and in very large or medium-sized cities (24.8 and 21.2 percent respectively). Comparisons by current religious preference suggest that men who declare no religious preference are those at highest risk for current PTSD.

Females

Fewer characteristics are associated with an increased prevalence of PTSD among Vietnam theater veteran women than among men. This may reflect the greater homogeneity of this subgroup, in that most were nurses. The small sample size prohibited comparisons by race and ethnicity, but comparisons by year of birth revealed that, similar to the pattern observed for men, those born before 1940 have PTSD rates under 5 percent, whereas those born during the 1940s (1940-1949) have essentially twice that rate (approximately 10 percent).

There was also little variation in current PTSD rates among women by type of entry to military service, branch of service, or service in the Reserve or National Guard. However, as with men, those who served on active duty for more than 20 years have especially low rates of disorder, whereas those serving four to 19 years have somewhat elevated rates. Interestingly, women who served in the junior officer pay grade (01-03) have almost twice the rate of current PTSD as the more senior officers (04-06).

Like the men, women also showed little variation in PTSD prevalence by year of entry to Vietnam, but also no substantial differences by age or length of service. However, those who served in I Corps and Corps have higher rates of PTSD than those who served elsewhere. Noted earlier in this chapter, women exposed to high levels of exposure stress, such as exposure to the wounded and dead, have seven times rate of current PTSD as those with low or moderate levels of exposure. Moreover, although the sample sizes are small, those who were wounded (20.3 percent) or received combat medals (15.0 percent) also have higher than average current rates of PTSD. Women who are current or members of veterans' organizations and those who have had some contact with the VA also have essentially twice the rate of current PTSD nonmembers and those who have not contacted the VA.

Women who are divorced, separated, or living as married also have substantially higher rates of PTSD than those who are married, and, unlike the findings for men, the prevalence of current PTSD is higher among female theater veterans with some college (11 percent) or postgraduate training (10 percent) than among high school or college graduates (3.8 and 6.4 percent respectively). The prevalence of current PTSD is also higher among theater veteran women with incomes of less than \$20,000 per year (10.4 percent), those who currently reside in the West (14.7 percent) or in medium-sized cities (14.3 percent), and those who state no religious preference (26.8 percent).

PTSD CASE EXAMPLES

To illustrate how the PTSD prevalence rates translate into individual human terms, several case examples were drawn from the NSVG theater veteran sample. These cases are ones for which all five of the primary indicators of PTSD were positive; these are clearly current cases of PTSD. The selection of the cases was based on two factors: (1) each was judged by the research team clinicians to embody the hallmark features of PTSD in theater veterans, and (2) each was sufficiently typical that even with changes made for the purposes of disguising individual identities, the essential attributes of the disorder and their impact on work and interpersonal functioning were recognizably retained. Each case description represents a real veteran who participated in the survey and clinical interviews. We have changed a number of specific details and identifying characteristics (including the initials) to preserve the confidentiality and anonymity of each respondent while retaining the richness and vividness of his or her individual human experience.

J.S.'s Story

J.S., a Hispanic male veteran in his late 30s, has been married for almost 20 years, has three children, and works as a semiskilled laborer. He lives in a large metropolitan area in the Northeast. He is the eldest of four children and grew up in a poor but stable and supportive family environment. He was drafted into the U.S. Army in 1966 and served one tour of duty in Vietnam, which ended in 1968.

His primary duty was reconnaissance in an infantry unit. He experienced high and sustained war-zone-stress exposure; he walked at the point of the squad, was frequently under fire, witnessed the death and injury of

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TOTOWA, NJ: ROWMAN + ALLANHELD, 1983

12

The Manning of the Force and the Structure of Battle: Part 2—Men and Women

DAVID H. MARLOWE

In this chapter I consider the questions of the employment of female troops by the military and the conscription of women. I argue that women should be excluded from offensive ground combat roles, but not from combat roles in the air or at sea, and not from ground combat support and service support roles that may require possible defensive combat operations.

War and Biology

Throughout all of recorded history, war has been a male occupation, a fact that seems to be firmly rooted in the biology of our species. Human beings, like the other primates, are products of an evolutionary process that has taken place within the context of biological and social systems that define divisions of labor and function. Until the Neolithic period and the rise of specialized division of function within communities, male evolution was controlled to a great degree by fighting ability. Women, as bearers and rearers of young and as gatherers of foodstuffs, evolved within what some have called a more domestic and less agonistic framework. Different, rather than identical, selective pressures have operated upon men and women. In response to these pressures, the evolutionary process has defined biologically ordered gender differences that extend beyond those of simple primary and secondary sexual characteristics. Such differences do indeed interact with culture to produce a wide range of behavioral possibilities, competences, and repertoires. The range of possibilities remains constrained, however, by the biological substrate that characterizes each gender. Behavioral possibilities for humans, as for all animals, are an end product of the interaction of organism and environment. No organism is infinitely plastic, and the biological substrate of each defines the limits to which the environment may alter it.

Sexual dimorphism characterizes our species. Women average 86–89 percent of the bulk and volume of males; however, the differences are not those of scale alone, but involve body architecture as well. Muscle mass, upper-shoulder girdle structure, capacity for burst energy output, and a host of other factors all

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ary," *Focus*, 1975, p. 6.

exemplify those differences imposed by the male hunter-fighter template, as opposed to the female nurturer-gatherer one.

Testosterone, the male hormone, is responsible not only for differences in brain structure between male and female mammals, but also has, in most primates, significant relationships to aggressive behavior.¹ While human studies are not conclusive, one recent Swedish study demonstrated a significant relationship between plasma testosterone levels and self-reports of physical and verbal aggression, the changes in testosterone level mainly reflecting responsiveness to provocation and threat.² Males also apparently differ from females in their response to external stress or threat, since male adrenaline levels are more readily raised than those of females, a probable advantage in the response to assault and attack.³ Corinne Hutt has outlined the basic differences between human males and females:

From infancy to senescence males have a consistently higher basal metabolism and greater vital capacity, they develop proportionately larger hearts and lungs, have a higher concentration of hemoglobin, notably after puberty, and have a greater capacity for neutralizing metabolites. . . . Since the male body has less fat and more muscle per unit volume, its inertia will be less and hence speed of movement greater. Muscular development and efficiency too are far superior in boys. Moreover, the greater length and smaller "carrying angle" of the male's arm ensures greater velocity and precision in aiming and throwing skills. Such differences in physical and physiological features equip the male for a more active and strenuous life, the evolutionary advantage of which is self-evident.⁴

It is unfortunately necessary to point out that these differences are not differences in the political, social, moral, or human worth of men and women, as is at times mistakenly inferred when such differences are noted. They are differences in capacity, biological design, and ability to perform certain kinds of actions between males and females as populations. While the populations evidence some overlap, the means remain widely divergent. Cultural changes that lead to higher female physical capacities tend to take place among a small group that overlaps the lower levels of normative male ability, while increased physical training of males tends to maintain the same relationships between group means. It is unfortunate that both an androcentric culture and its feminist critics treat such abilities as expressions of inherent value rather than of exoteric biological difference. To say that men and women are biologically different and have differing capacities to perform certain kinds of actions and master certain skills should in no way imply that either men or women are better or worse than each other; only that as populations they are indeed better or worse at doing certain kinds of things. One of these things is fighting, certainly in the forms required in land combat. The male's greater vital capacity, speed, muscle mass, aiming and throwing skills, his greater propensity for aggression, and his more rapid rises in adrenaline make him more fitted for physically intense combat. The issue is neither an ideological nor a political one, although both ideologists and politicians have seized positions in respect to it. The adult human being is the result of a sequence of interactions between fundamental phyletic biology and culture and the social system; each poses limits and introduces possibilities for change, but the fundamental parameters remain the same transculturally, no matter how different cultural conceptions of maleness or femaleness may be.⁵

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Combat and Masculinity

The question of women in the services is further complicated by the powerful relationship between "maleness" and the self-percept of the combat group among American soldiers. While undoubtedly a number of women possess physical skills and abilities that do overlap into the normal male distribution, physical competence alone does not demarcate the successful combat soldier or combat group. The combat soldier has historically defined himself in terms of his masculinity.

It is probable . . . that the young male has a biologically given need to prove himself as a physical individual, and that in the past the hunt and warfare have provided the most common means of such validation.⁴

A widespread relationship links male sexual validation and validation in war, combat, and aggression. Until recent times, many human groups' definition of the male as sexually mature and eligible for marriage and intercourse was contingent upon his having proven himself as a warrior in battle. For example, the Afar and Issa peoples of the Horn of Africa required the slaying of an enemy in combat before a male was eligible for marriage.⁷ Among the Somali the demand for blood vengeance following assault is underlined by threats to withdraw sexual access and taunts about sexual unworthiness made by the women of the group to goad the men into combat.⁸ The examples can be multiplied for human groups on every continent and at almost every level of societal complexity. Combat in all human groups is and has been an almost exclusively male preserve, and organized warfare has been, in a sense, the expression of the male-bonded groups that constitute armies and their analogues. As Lionel Tiger put it, "Males are prone to bond, male bonds are prone to aggress, and therefore aggression is a predictable feature of human groups of males."⁹ The military group is, in this sense, a reflection of the myriad other adolescent and youthful male groups that in most cultures traditionally play either a formal or informal role in the process of maturation and the acquisition of full male sexual and social identity. These institutions range from the *poro* and other age-graded groups in African societies, including circumcision and warrior-age class groups, to the men's societies and men's houses of the Circum-Pacific and other specialized groups. Horizontally bonded, exclusive groups of young males have also characterized the social developmental process in Western Europe. These range from groupings of apprentices and students to those of young professionals, all based upon highly elaborated and complex percepts and images of male brotherhood.¹⁰ The United States has since its founding been marked by many like groups in the form of gangs, militias, volunteer fire companies, and other organizations that partake of elaborate sets of constructs of masculinity and male behavior. Most have included agonistic behavior as an aspect of their *raison d'être*.¹¹ These male-bonding and agonistic behaviors are remarkably close to many of those exhibited by the infra-human primates, as is the predilection for more highly aggressive play on the part of the human male as compared to the female. To carry the illustration further, not only is the capacity to carry out aggression—i.e., to fight—related to the nature of the male bond, but a great part of the bond's sustaining power lies in the language of male sexual identity. As one sociologist stated, just after World War II:

In the purely masculine surroundings of the Army, the values associated with the ideal of virility play a determining role in molding the soldier's image of himself and in creating his inner tensions and the channels for their release.¹²

The soldier's world is characterized by a stereotypical masculinity. His language is profane, his professed sexuality crude and direct; his maleness is his armor, the measure of his competence, capability, and confidence in himself.

The self-image of strength is evidenced in both the manner of expression and the expressions used. That the expressions may be more clever, more picturesque, or more obscene than the civilian equivalents is not relevant here; it is only relevant that to the soldier they are stronger ways of saying things and so manifest the image of a stronger self.¹³

Hamburg and Washburne put forward the interesting hypothesis that language plays the same role for the human male, in respect to aggression and agonistic behavior, that display plays for the primate (e.g., baring of the canines, chest thumping, display of the ruff, and so forth).¹⁴ Such a homologue would provide another biologically based explanation for the compelling and aggressive use by males of obscenities in military groups.

This stronger self is built through the metaphor of the soldier's masculinity. He is "big balled"; his image of toughness, endurance, aggressiveness, and fighting skills is structured in good part upon his maleness and his being a "man among men." Tests of his maleness are symbolic tests of his combat potential, and the belief in his masculinity and toughness provide mechanisms that enable him to prepare for and accept the terrors of combat. These tests lie at the heart of incorporation of new members into the combat group, as Bey described it, in Vietnam:

The combat unit is an intensely close knit group. Initially, the "f.n.g's" [fucking new guy] anxiety is likely to be increased by the group's asking him extremely personal questions and telling him "war stories." One unit, for example, held "court" and sat around the new man while one of the old timers asked him whether or not he performed and enjoyed cunnilingus.

In another unit the members of the company sang the following song to the newcomer:

You're going home in a body bag, doo da, do da
You're going home in a body bag, oh, doo da day.
Shot between the eyes, shot between the legs,
You're going home in a body bag, oh, doo da day.

Bey then goes on to point out that, "Surprising as it may seem to the reader, in most instances these group confrontations tend to quickly establish closeness and a counterphobic stance towards the combat situation in the new arrival."¹⁵

Male sexual metaphor comes to symbolize aspects of the self and of the group and its power and consequently becomes an aspect of maintaining the group in combat. It divides the soldier from the civilian and defines the combat group both to itself and to others. An example of this use of sexual symbolism was related to the author in Vietnam in 1964, where certain special forces units quasi-publicly defined themselves through their sexual behavior. Several massage parlors in South Vietnam were considered their regular territory; they never engaged in vaginal intercourse; the women in the massage parlors were engaged exclusively to perform fellatio upon them. This was the diacritical that contrasted them with other American groups in Vietnam, as it was widely believed that Vietnamese prostitutes had an abhorrence of oral sex and normally refused to perform it.

the pledges of affection, the endless reassurances required by the love of men and women. It is, unlike marriage, a bond that cannot be broken by a word, by boredom or divorce, or by anything other than death. Sometimes even that is not strong enough. Two friends of mine died trying to save the corpses of their men from the battlefield. Such devotion, simple and selfless, the sentiment of belonging to each other, was the one decent thing we found in a conflict otherwise notable for its monstrosities.¹⁹

In the world of the combat soldier, then, masculinity is an essential measure of capability. In an interaction between male bonding and widespread cultural norms, the maleness of an act is the measure of its worth and thus a measure of one's ability. While many may disapprove of these norms, they have been and are, as a matter of ethnographic fact, the operative ones in much of military society and particularly in the combat group. In observations made at a basic-training center during the period in which it was being gender-integrated, the importance for the male of definition by maleness and therefore toughness became clear. Almost universally the males felt that they had been subjected to less intense physical training and less challenging soldierly training than they would have been in an all-male environment. Men in units with women in them contrasted their training unfavorably with that of exclusively male neighboring units. The neighboring units were seen as producing tougher, more competent, militarily better trained, and "harder" soldiers. Long discussions were carried on about the challenge of bayonet training, for example, which was debarred to the integrated units but still carried out in the units not yet integrated. Many young men voiced the feeling that they had somehow been cheated. They had neither been stretched to their limits nor challenged in their masculinity, and consequently were poorer soldiers than they might otherwise have been. In reality, the training programs in all the companies were essentially identical, operating to the same physical training standards and exercise requirements. No basic-training unit at the post in question had received bayonet training for almost ten years. The issue involved was one of self-image and self-esteem. The presence of women lowered the perceived value of the training to many of the men, who asked themselves, "If women can do it, how much of a challenge can it be?" It is interesting that most of the young men felt that the women were good soldiers as well as friends and there was a fair amount of cross-gender cooperative behavior. Almost all agreed that women should be in the Army and almost all, of both sexes, agreed that women should not be "combat soldiers." At the same time, the males had judged *themselves* wanting. If women could do all of the things they could do, how good could they be? The answer of most was, "Not very good."

While we may characterize such attitudes as sexist, disapproval does not change the fact that they are a significant part of our common culture, nor does it speak to the high probability, given our present state of knowledge, that such attitudes and behaviors might well be grounded in those fundamental biological structures that underlie gender difference. One need not go to the extreme view that "biology is destiny" to recognize that biology shapes and may control certain aspects of destiny. It is fair to say that interactions of biological and sociocultural evolution have combined to make men more competent fighters to begin with. The absence of any reliable historical data indicating that women have ever served as part of the regular forces of organized combat in any human society does not preclude the possibility that women might so serve effectively. But it does present a powerful inductive and probabilistic argument that the lack of such participation reflects a deep-seated set of sociocultural and biological differences

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between the genders. The charge often made that such "sexism" simply reflects culturally based attitudes is, I believe, scientifically ill-grounded. Fighting groups, armies, and warriors have always been male. While women have participated in irregular warfare, in the defense of invaded homelands or as symbolic leaders, they have never been part of the actual land fighting forces of group, clan, tribe, or state. The image of the woman warrior has, in fact, been more an image of the alien, as in the Amazons of Greek mythology and Herodotus, or of a horrific reversal of the natural order, a world turned upside down and made preternaturally threatening, as in Chinese legend. As Walter Burkert puts it: "A combat of men with women is a startling inversion, the Amazon myth, or wife killing her husband."²⁰ Perhaps for this reason the most terrifying aggression in the myths of the West is embodied in female forms, the Erinnyes, the Maenads, the Gorgons. But we must remember that the warriors serving even the most blood-thirsty of mythic creatures were almost invariably males.

It is sometimes averred that these biologically based arguments against the use of women in combat are analogous to the racist arguments that were invoked against the employment of black troops and the integration of blacks in the U.S. Army in the past. Prejudice against blacks in the armed forces, however, was the creation of a social system and culture during a single temporal period. The issue of the competency of blacks to fight was almost a distinctly American problem as, to a lesser degree, was that of integration. It involved biological assertions of inferiority and incapacity made in the face of thousands of years of black success as warriors and in the face of a history of combat success on the part of integrated fighting units in the classical world in the armies of Islam or even in *Othello*.²¹ No such evidence exists for either the combat competency of women or the successful integration of women into fighting armies.

Many who advocate posting women to combat units seem to have little conception of the physical, as well as psychological and emotional, demands of ground combat. Women can indeed fire most weapons as well as men can; however, firing weapons is only a small part of ground combat. The larger part consists in getting the weapon, ammunition, and other equipment to those places from which the weapon can be used most effectively. The combat infantryman moves with combat pack, weapons, ammunition, grenades, and other equipment. At times he moves steadily; at times he must make short rushes over broken terrain, doubled over to minimize his size and bearing between 60 and 120 pounds of gear.²² The combat arms soldier must, at the same time, be capable of killing with his clubbed weapon, with a knife, and with his hands and feet. As an old Army saying goes, "The object in war is not to die for your country, but to make the other fellow die for his." If we are serious about the missions that are mandated for the combat arms, we cannot afford to make them a locus of social experimentation. The reason is simple: we can afford to do nothing that would lessen their combat potential and power, else we run the risk of losing the war and sacrificing a force that was not the best structured to perform its job.

A Place for Women?

If those physiological traits conducive to success on the battlefield and those sociocultural aspects of the combat group critical to cohesion and endurance in battle seemingly preclude women from the combat arms, two questions still remain. Should women be drafted, and should women serve in combat (if not in the combat arms)? The latter question is, in effect, moot. In the worst-case war defined by Soviet tactical thought all forces in the theater are combatants.

Arguments about women in combat that hinge on images of "dead daughters at the front" are built out of the metaphors of past wars, not future wars. Long-range rocketry, long-range artillery, fighter-bombers and gunships, tactical missiles, and theater tactical nuclear weapons make the potential front as deep and as wide as Europe. Women in combat support and combat service forces will be under regular enemy fire and attack. Since Soviet doctrine calls for massive deployment of airborne forces, its enemies' depots, maintenance areas, communications and intelligence units, airfields, and ports may also come under direct as well as indirect attack. To debate whether women should be in combat is really to debate whether women should be in the armed forces at all, and that debate is, I think we would all agree, closed. Those who engage in the debate seem to forget that women served overseas in support functions during World War II and that they suffered casualties at the same rate as noncombatant men (0.5 percent).²³ Female casualties would, of course, be extremely high in the course of any ground conflict with the Soviet Union, but this would be equally so for all noncombatant support personnel. Possible "smaller" wars may well involve equally widespread combat, if the enemy forces are armed by and follow Soviet doctrine. Guerilla and terrorist wars place all at risk, regardless of job in the armed forces, since the entire nation is the battleground. Indeed, it may even strike some as strange that those who oppose the deployment of women overseas by invoking the image of daughters dead in battle do not usually use the same sentimental language to describe the dead dependents of our male personnel and the dead female citizens and children of our allies. If women are not, for many of the reasons adduced above, to be posted to combat arms or certain combat support units (infantry, armor, artillery, combat engineers, combat military police), what should the roles for women be?

Here I must say that I believe that women should be drafted in any new Selective Service System. The argument is the same one I offered in Chapter 3 for drafting men. An army capable of winning and, perhaps more important, of deterring the kind of warfare set forth in the Soviet scenario must have the most competent and highly skilled personnel available manning its force, its weapons, and its support systems. Because the demands of war are inequitable, demands for personnel will be inequitable. Equity in war cannot imply equal opportunity for all regardless of capabilities. One would, to put it simply, not put a 98-pound weakling in the ring with Mohammed Ali unless one began with the premise that we should all have equal access to defeat. If we are to staff our military force in a way that will ensure optimal competence, skill, and ability, women will have to provide a significant part of that force, particularly if that force is ever expanded significantly. The declining size of the male youth population will require in future years at least one out of every three eligible males of nineteen just to maintain present force levels. In the past two years the Army seems to have reached a limit in tapping the number of women available for service as voluntary enlistees, despite the recent lowering of standards. In point of fact, if the Israeli experience is any guide, the available pool of women for conscription will be markedly lower than for men. Women will be ineligible for service not only on the same physical and mental grounds for which vast numbers of men have been and will be excluded, but also on grounds of pregnancy and, particularly, religious commitments. In Israel 18 to 20 percent of women are excused from the draft because of declarations of fundamentalist orthodoxy.²⁴ It should be anticipated that an almost equivalent percentage may request deferment in the United States based upon fundamentalist religious objections to such "violations" of traditional female roles.

Many social and psychological barriers to the wider employment of women in

images of "dead daughters at home, not future wars. Long-range and gunships, tactical missiles, and tactical front as deep and as wide as the service forces will be under the calls for massive deployment in the areas, communications and command come under direct as well as the combat is really to debate, and that debate is, I think we in the debate seem to forget that during World War II and that they were not men (0.5 percent).²³ Female in the course of any ground conflict for all noncombatant support in the equally widespread combat, doctrine. Guerilla and terrorist forces, since the entire nation seems as strange that those who evoking the image of daughters in the language to describe the dead female citizens and children reasons adduced above, to be in units (infantry, armor, artillery, would the roles for women be? should be drafted in any new one I offered in Chapter 3 for perhaps more important, of the scenario must have the most in manning its force, its weapons, war are inequitable, demands cannot imply equal opportunity it simply, not put a 98-pound woman began with the premise that to staff our military force in a and ability, women will have to if that force is ever expanded population will require in future of nineteen just to maintain seems to have reached a limit service as voluntary enlistees, of fact, if the Israeli experience of participation will be markedly lower not only on the same physical men have been and will be particularly, religious commitment from the draft because of should be anticipated that an event in the United States based on "violations" of traditional consider employment of women in

the Army have already been broken down both in terms of traditional jobs (hospital and clinic-based medical, clerical, secretarial) and many nontraditional ones (diesel mechanics, telephone wiremen, military police, etc). The critical question is, in what array of jobs within the force will women not only perform well but enhance the overall combat power of the organization? We must not forget that the majority of women in the United States and the overwhelming majority of women in the services desire more "traditional" (female) jobs and actively indicate a preference for such jobs. Military occupational specialty (MOS) analysis should be cognizant of the special skills, competencies, and strengths that women bring to the armed forces and the workplace, as well as the values and sociocultural biases that they also bring. The basic barriers to assignment should then be rationally constructed in terms of effects on combat competence and power. It should be remembered that in the average run of noncombatant jobs there would be little to choose between the defensive skills and abilities of male and female personnel. Both would be partially trained and skilled at armed defense and at fairly equal risk if attacked by aggressive enemy combat troops.

Particular attention should be paid to women's skills that represent greater potential competency in critical areas. For example, women's finer-grained muscle movements and control would probably make them more effective repairers of complex electronic equipment. Girls have more sensitive touch thresholds and keener senses of smell, and are better at discriminating and localizing sounds than are boys. They are superior in recall and recognition memory and have better recall of auditory material. Women have better verbal skills and tend to process verbal data better than men do.²⁴ Many of these differences reflect differences in brain organization and left-right hemisphere dominance, presumably as differentially keyed between the two sexes by estrogen in females and testosterone in males. Again, our biological templates seem to provide for different and in some cases complementary innate capacities and potential skills. Women, then, should be drafted, trained for, and assigned to those MOSs that they are most able to fill. It is obvious that some jobs will be equally well performed by women and men; others, one would hypothesize, better by women; yet others, better by men. Jobs should be analyzed in terms of the primary and secondary abilities required to fill them, and of the other range of potential jobs which each individual might be asked or cross-trained to fill, and then opened to men or women on the basis of ability and potential. The better ability of women at processing verbal data and at verbal recall would, for example, probably make them more desirable as radio communicators in those ambients which control the battle—headquarters, command, control centers at levels of brigade, division, corps, etc. That those involved in communications at the company level must also function as combat infantry should, however, debar those jobs to women on the thesis that their lesser capacity as fighters and their intrusion as females into a male-based and -bonded combat group could threaten the competence and integrity of that group. Analyses of the entire repertoire of military roles and occupational specialties are required to determine those which women may effectively fill. Gender-free physical and mental criteria would then define the standards governing assignment. It is most probable that those criteria that would debar women from direct combat engagement roles in the land forces would not apply to direct engagement roles in the Navy and Air Force. Jobs with greater reliance upon technical skill than upon the physical, psychological, and social factors that ensure effectiveness in land warfare may well be efficiently staffed with female personnel. A broad spectrum of direct combat positions aboard combat naval vessels and combat

aircraft could undoubtedly be performed equally well by women and men. Such restructuring would, of course, require revision of the Army's combat exclusion policy that bars women from all direct engagement roles, including the piloting of helicopters and light aircraft in the combat zone, and a change in the public law that bars women from direct combat service in the Navy and Air Force.

In summation: modern war involves no sharp discontinuities with modes of successful warfare in the past. The processes and capabilities that characterize the successful military group involved in direct engagement with the enemy will continue to make for combat success. A number of fundamental factors debar women from such groups, and their inclusion would threaten group efficiency and power. The consequences of such a threat could be costly. Technological change has vastly increased the complexity of modern war, however. In its myriad new functions, ranging from intelligence and electronic warfare to maintenance and repair of critical equipment, the skills, talents, and abilities of female personnel are vital.

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13. Frederick Elkin, "The Soldier's Language," *American Journal of Sociology* 51 (March 1946): 418.
14. David A. Hamburg and S. Washburne, "Aggressive Behavior in Old World Monkeys and Apes," in *Primates: Studies in Adaptation and Variability*, edited by P. Jay (New York: Holt, Rinehart & Winston, 1968).

well by women and men. Such of the Army's combat exclusion roles, including the piloting of, and a change in the public law the Navy and Air Force.

discontinuities with modes of and capabilities that characterize engagement with the enemy will be of fundamental factors debar could threaten group efficiency and be costly. Technological change war, however. In its myriad new onic warfare to maintenance and and abilities of female personnel

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GENDER TRENDS IN THE U.S. ARMY AND A DISCUSSION OF IMPLICATIONS FOR READINESS AND RETENTION¹

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Summary.—The percentage of female soldiers and officers in the U.S. Army has increased dramatically during the last few decades. Gender appears to be correlated with rank, age, education, and race, making it difficult to draw definitive conclusions about the effects of gender on retention or readiness. Evidence regarding gender and retention is mixed, but available evidence on gender and individual and unit readiness suggests that gender does not adversely influence readiness at either level. However, there is little evidence to date on the effects of gender within combat units, leaving that question open to debate.

Many of the structural changes in U.S. Army families can be attributed at least indirectly to an increase in the percentage of female soldiers in the Army. For example, the occurrence of dual-career Army couples in which both the husband and wife are serving on active duty is dependent upon a supply of male and female soldiers. Likewise, the occurrence on active duty of female single parents depends on a supply of never or formerly married female soldiers. In past decades, as discussed in detail elsewhere (21), military policies and legislation restricted some family forms by forcing single parents or dual spouses out of the service, but these limitations have been largely removed, with the exception of the combat arms restrictions. However, as Stoddard (40) has pointed out, upcoming cuts in military budgets and personnel may threaten the advances that women have made in securing their rights to participate, regardless of their family structure, in the U.S. military.

Our objective in this brief report is to summarize advances in gender participation in the U.S. Army, part of the work accomplished for the Army Family Research Program (AFRP), commissioned in 1986 by the Chief of Staff of the U.S. Army (9) to answer policy-relevant questions about Army

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families.² While bits of evidence about gender trends are available in a variety of sources (8, 21, 28, 30, 39, 40), we are not aware of a comprehensive, widely available report detailing gender trends since the 1940s for the U.S. Army.³ We report not only official personnel data, but figures reported from a variety of surveys of U.S. Army soldiers conducted since 1979 or earlier.

Public Law 625, the Women's Armed Services' Integration Act of 1948 (the Integration Act) permanently established the role of women in the U.S. armed forces but at the same time limited their participation to less than two percent of any of the services (21). The two-percent ceiling remained until 1967 when Public Law 90-130 was enacted, with one goal of easing personnel shortages associated with the developing Vietnam conflict.⁴ The draft ended in January 1973; henceforth, all new service members, male or female, would be volunteers. Restrictions on retention of single parents and pregnant soldiers were ended in the 1970s, allowing many women to remain in service who previously would have been released involuntarily. The military services deliberately allowed the percentages of females to increase to help sustain the volunteer military concept, although not without reservations about what the maximum percentage of female service members should be; however, test results reported in 1977 and 1978 indicated that Army units could function with up to at least 35% females without a loss of unit functioning (21, p. 18). Despite a pause in recruiting emphasis on women in the early 1980s, all services were allowed to increase recruitment of women to a percentage negotiated by each service with the Department of Defense (21).

The data in Table 1 reflect the legal changes discussed in the previous paragraph. The percentage of female soldiers remained below two percent until 1972 and more than quadrupled during the next decade, slowing down for a year or two in the "pause" of the early 1980s and then increasing to the present levels of approximately twelve percent.⁵ While the changes in the percentage of female soldiers are substantial, if not remarkable, the more important questions concern the potential impact on U.S. Army retention and readiness of such demographic shifts within the service. Therefore, recent literature regarding the correlates of gender and the possible relationships with retention and combat readiness will be reviewed and discussed in the next section of this report.

²"The AFRP, sponsored by the U.S. Army Community and Family Support Center, is being conducted by the U.S. Army Research Institute for the Behavioral and Social Sciences, with the assistance of a contract research team led by Research Triangle Institute" (38, p. 404).

³Devilbiss (21) has provided a comprehensive report on all female military personnel from 1945 to 1988, but she did not report the percentages for Army females, whether enlisted or officer.

⁴The law also permitted, for the first time, women to attain general officer rank, which finally occurred in 1970.

⁵The percentage of females in the Army is lower than the percent of females enlisting among new recruits, which, for example, was 13.5% in 1988 for the Army (28).

TABLE 1
PERCENT OF FEMALE OFFICERS AND ENLISTED PERSONNEL IN THE U.S. ARMY
BY YEAR, VARIOUS SOURCES (1940-1993)

Year	Officers	Enlisted	Total	Sources/Remarks
1940	5.1	0.0	0.4	(24)
1942	6.0	0.0	0.4	(24)
1943	6.2	0.9	1.3	(24)
1944	6.1	1.0	1.5	(24)
1945	7.6	1.2	1.9	(24)
1946	6.2	1.0	1.8	(24)
1950	6.2	1.3	1.9	(24)
1955	4.5	0.8	1.2	(24)
1960	4.2	1.1	1.4	(24)
1965	3.4	1.0	1.3	(24)
1966	3.5	0.9	1.1	(12)
1967	3.3	0.8	1.0	(12)
1968	3.1	0.8	1.0	(12)
1969	3.0	0.8	1.1	(12)
1970	3.1	1.0	1.3	(24)
1971	3.4	1.2	1.5	(12)
	3.7	1.2	1.5	(40)*
1972	3.6	1.8	2.1	(12)
1973	3.7	2.4	2.6	(12)
1974	4.1	3.9	3.9	(12)
1975	4.5	5.6	5.4	(24)
1976	5.0	6.4	6.2	(12)
	5.3	6.1	6.0	(40)
1977	5.5	6.7	6.5	(12)
1978	5.6	7.2	6.9	(12)
	8.0	8.8	8.7	(32)*
1979	7.3	7.4	7.4	(27, 29) ^b
1980	7.7	9.1	8.9	(24)
1981	8.6 ^c	8.8	8.7	(40)
1982	8.8	9.5	9.4	(22)

(continued on next page)

Note.—Actual Army strength varies monthly throughout the year; hence, reports will vary depending on their effective date. Furthermore, actual Army strength figures are reflected only in primary sources such as the DCSPER 46; other official but secondary sources (1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 18, 19, 20) may summarize primary sources. Unofficial sources (8, 22, 23, 24, 28, 40) usually cite official sources but may make mistakes in the process. Surveys (11, 26, 27, 29, 32, 35) are often weighted to approximate official strength figures but they remain unofficial and only estimates. Different sources are cited in Table 1 to educate readers on how gender estimates may vary depending on source and timing.

*Usually, within-year variations in percentages reflect selection of different quarters of the year for determining the percentages; in this example, however, both sources (12, 40) claim to be using June 30, 1971 data.

^bBased on the Sample Survey of Military Personnel conducted twice annually by the Army Survey Office, conducted in this case in November. The remaining SSMPs cited in Table 1 were conducted in August 1983, 1984, and 1985; October 1986; Fall 1987, 1988, 1989, 1991, and 1992; and Spring 1993. See Appendix (pp. 509-511) for details on the SSMP.

^cBased on the 1979 DoD Survey of Officer and Enlisted Personnel (See Appendix, pp. 509-511).

^cReported as 9.6 by Stoddard (1993), the correct value appears to be 8,254/96,179 = 8.6%.

TABLE 1 (CONT'D)
 PERCENT OF FEMALE OFFICERS AND ENLISTED PERSONNEL IN THE U.S. ARMY
 BY YEAR, VARIOUS SOURCES (1940-1993)

Year	Officers	Enlisted	Total	Sources/Remarks
1983	8.8	9.7	9.6	(8, 34)
	9.0	9.9	9.7	(22)
	NA	9.9	NA	(32)
1984	9.4	10.0	9.9	(24)
	9.1	9.8	9.7	(1) ^d
	9.5	10.0	9.9	(2)
1985	NA	10.0	NA	(32)
	9.9	10.2	10.1	(3)
	9.9	10.3	10.2	(13)
	9.9	10.2	10.1	(32)
	9.1	9.7	9.6	(26, 27)
1986	9.9	10.2	10.1	(24)
	10.4	10.7	10.6	(14)
	10.5	10.5	10.5	(32)
	10.3	9.5	9.6	(40)
	10.7	10.7	10.7	(15)
1987	11.9	13.0	12.9	(32)
	10.7	10.8	10.8	(4)
	10.5	10.8	10.7	(23)
	10.4	10.6	10.6	(5)
	11.1	11.0	11.0	(16)
1988	12.1	11.8	11.9	(32)
	10.7	10.9	10.9	(24)
	11.4	11.4	11.4	(6)
	11.4	11.4	11.4	(17)
	12.7	11.2	11.4	(32)
1989	14.5	10.3	10.6	(35) ^e
	11.1	11.1	11.1	(24)
	11.1	10.0	10.1	(40)
	11.8	11.3	11.4	(18)
	11.5	11.4	11.4	(24)
1990	12.0	11.3	11.4	(19)
	8.5	11.2	10.8	(32)
	12.1	11.2	11.3	(7)
1991	11.9	11.2	11.3	(24)

(continued on next page)

Note.—Actual Army strength varies monthly throughout the year; hence, reports will vary depending on their effective date. Furthermore, actual Army strength figures are reflected only in primary sources such as the DCSPER 46; other official but secondary sources (1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 18, 19, 20) may summarize primary sources. Unofficial sources (8, 22, 23, 24, 28, 40) usually cite official sources but may make mistakes in the process. Surveys (11, 26, 27, 29, 32, 35) are often weighted to approximate official strength figures but they remain unofficial and only estimates. Different sources are cited in Table 1 to educate readers on how gender estimates may vary depending on source and timing.

^dData for all American Forces Information Service reports (1-7) are based on December 31 strength figures except for 1984, which is based on March 31 data.

^eBased on the 1989 AFRP Army-wide survey.

TABLE 1 (CONT'D)
PERCENT OF FEMALE OFFICERS AND ENLISTED PERSONNEL IN THE U.S. ARMY
BY YEAR, VARIOUS SOURCES (1940-1993)

Year	Officers	Enlisted	Total	Sources/Remarks
1992	12.1	12.3	12.1	(20)
	11.8	12.4	11.9	(32)
	12.1	11.5	11.6	(24)
1993	12.4	12.2	12.2	(32) ^f
	12.4	12.3	12.3	DCSPER 46 ^g

Note.—Actual Army strength varies monthly throughout the year; hence, reports will vary depending on their effective date. Furthermore, actual Army strength figures are reflected only in primary sources such as the DCSPER 46; other official but secondary sources (1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 18, 19, 20) may summarize primary sources. Unofficial sources (8, 22, 23, 24, 28, 40) usually cite official sources but may make mistakes in the process. Surveys (11, 26, 27, 29, 32, 35) are often weighted to approximate official strength figures but they remain unofficial and only estimates. Different sources are cited in Table 1 to educate readers on how gender estimates may vary depending on source and timing.

^fThe Spring 1993 SSMP data were weighted by gender and location to reflect data from the OMF/EMF, specifically the DCSPER 46 report. However, E-2's in Europe were not included in the weights because of a low response rate and no E-1's were sampled.

^gData based on the Department of the Army's Official Strength Report, known as DCSPER 46, Part I (Active Duty), as of 31 May 1993, provided by Dr. Peterson of the Army Survey Office.

DISCUSSION

Correlates of Gender

Race, rank, and age appear to be correlated with gender. In the 1979 DoD survey, approximately 37% of females and 43% of males were minority members; by the 1985 DoD survey, 51% of females were minority members, a substantial increase, while 41% of males (a slight decrease) were minority members (27). From Table 1, we have observed that, in 1985, female soldiers comprised about 10% of the active Army. In comparison to the 10% figure, Raiha (34) reported that 15% of all black enlisted soldiers and 14% of black officers were females.⁶ Stoddard (40) reported that across all military services the percentages of female officer personnel who were black and Hispanic rose from 3.3% and 1.7%, respectively, in 1971 to 12.9% and 2.0% in 1989; likewise, for enlisted personnel, the percentages of black and Hispanic soldiers rose from 14.4% and 3.3% in 1971 to 32.8% and 4.0% in 1989.⁷ Thus, gender appears to be confounded with race within the military, with black soldiers having a higher percentage of female representation.

Rank appears to be correlated with gender negatively, as women are less

⁶In contrast, female soldiers comprised 9% of Hispanic enlisted and 8% of Hispanic officers. Likewise, female soldiers accounted for 10% of white enlisted and 8% of white officer personnel.

⁷Moore (28) agreed with Stoddard (40) on the 1971 figures but cited 33.7% for enlisted black women and 13.2% for female black officers in 1989.

ARMY

Sources/Remarks

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reports will vary depending on their effective date. Furthermore, actual Army strength figures are reflected only in primary sources (1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 18, 19, 20) may summarize primary sources. Unofficial sources (8, 22, 23, 24, 28, 40) usually cite official sources but may make mistakes in the process. Surveys (11, 26, 27, 29, 32, 35) are often weighted to approximate official strength figures but they remain unofficial and only estimates. Different sources are cited in Table 1 to educate readers on how

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well represented at the higher ranks. In the 1985 DoD survey, females were concentrated at the lower enlisted and officer ranks compared to males (26). In the 1989 AFRP survey, 12.5% of junior enlisted were females compared to 7.6% of sergeants, with 17.7% of company grade officers being females compared to only 9.6% of field grade officers.⁸

Age is also correlated with gender, with female soldiers being younger than male soldiers on average. In the 1985 DoD survey, the median age for male soldiers was 24.7 years, for female soldiers 23.9 years (27). The differences in age were even more noticeable at higher ages; for example, among males, 11% were age 37 or older, compared to 3% of females (27).

Even though, on average, they are younger and of less military rank than male soldiers, female enlisted soldiers have more education: being less likely to have not completed high school (0.2% of all females compared to 2.1% of all males, among enlisted) and more likely to have more than a high school education (32.9% of all females compared to 25.9% of all males, among enlisted soldiers). Among officers, the pattern is split. Male officers are more likely to have not completed college (12.6%) than female officers (2.1%) but are more likely to have completed a graduate degree (40.9%) than female officers (32.1%) (26).⁹

The correlations of gender with race, education, age, and rank are a threat to the validity of simplistic analyses of gender in the Army since virtually any analysis that does not control for these other demographic factors cannot ascribe any effects found for gender to gender alone.

Implications of Gender

Retention.—Raiha (34) found that enlisted females had higher job satisfaction than enlisted males but that the pattern was reversed for officers. But, both enlisted and officer males were more likely to re-enlist. Janofsky (25) found in a survey of nearly 400 dual-military couples that female soldiers were less likely to expect to stay on active duty long enough to retire. Vernez and Zelman (41) reported that females were less likely to re-enlist or to complete their first term of service. However, Bowen, Orthner, Zimmerman, and Meehan (10) found no differences by gender on spousal support for the soldier's career. However, Moore (28) reported that, across all services, all females, but especially black and Hispanic females, were more likely to re-enlist than males of any race for their first and second terms of en-

⁸Company grade officers include lieutenants and captains; field grade officers include majors and colonels.

⁹This anomaly may occur because younger male lieutenants may have recently been commissioned through Officer Candidate School before completing college, older officers were commissioned in the Vietnam era without a college degree, and because senior officers have gone back to get advanced degrees. The Army can afford to be more selective with female lieutenants and the cohort of female officers in the older, senior group most likely to return to school for advanced degrees in smaller, relative to male officers, than the younger cohort.

listment (but males were more likely than any females for the third term). Thus, the evidence is mixed regarding retention for initial tours but seems to favor male retention in terms of retirement. However, taking into account the probability that higher education, younger age, and possibly even minority status among females may favor them with respect to civilian jobs, it is quite possible that gender has little to do with retention once other demographic factors are controlled.¹⁰

Readiness.—Raiha (34) found no gender differences in ability to cope with work responsibilities but noted that females were promoted more rapidly than males. She (34) also found that female soldiers with children were more likely to be overweight (5.9%) than those without children (2.1%). Although she (34) reported that females were more likely to exceed weight standards,¹¹ they also had fewer alcohol-related problems and a lower incidence of drug abuse. While Pliske (33) reported that female soldiers had a slightly lower rate of preparing wills and powers of attorney than male soldiers, there were no clear differences from males on having workable arrangements for care of dependents for short-term, long-term, or evacuation deployments. In the RAND survey (11), female soldiers were more likely to report taking time off duty but they also reported fewer job-related problems than male soldiers. Table 2 shows zero-order Pearson correlations obtained in an analysis of 495 units from the AFRP study between the percentage of males in units and unit level (or aggregated individual-unit member scores) variables (36). Units with a greater percentage of females were more likely to be combat service support-type units, had a higher percentage of higher ranking personnel, had more personnel who lived off post, a higher percentage of married personnel, and a higher percentage of dual-military couples, but had fewer relatives living nearby. Units with more females were less likely to have family support groups or to have sent premove information to incoming soldiers, but their soldiers were more likely to have used sponsorship assistance within the past year.¹² Units with more females tended to have fewer soldiers with financial or transportation problems, perhaps because more soldiers were working second jobs. Units with more females had soldiers who reported lower scores on alienation, higher scores on work satisfaction, higher ratings of Army-family fit, higher commitment to Army values, and higher spouses' supportiveness for retention. However, units with more females appeared to have more problems of relocation adjustment and lower

¹⁰Secondary analyses of existing data sets that would allow a test of this hypothesis are beyond the scope of this study.

¹¹Because the Army has strict policies on eliminating overweight personnel, this situation might account in part for any evidence of lower retention of females than males.

¹²This result may simply reflect more females having been recently assigned (within the past year) to units.

TABLE 2
ZERO-ORDER CORRELATIONS BETWEEN PERCENTAGE OF UNIT BEING MALE
SOLDIERS WITH MEASURES OF UNIT STATUS AND READINESS

Independent Variable	<i>r</i>
Type Unit	
Combat	.53
Combat Service Support	-.45
Soldier Demographics	
Soldier rank/pay grade	-.13
Soldier renting off post	-.21
Family Demographics	
Currently married	-.20
Married to military spouse	-.56
Close relative living within two hours	.09
Unit Support for Families and Soldiers	
Received information on new location before move	.10
Unit has family support group	.18
Individual Responsibilities	
Number of months of unpaid bills in past 12 months	.15
Has transportation to unit in emergency	-.16
Currently working second job	-.12
Has used sponsorship assistance	-.26
Family Strength and Adaptation	
Lack of alienation	-.17
Family Adjustment to Army Life	
Support for Army policies	.09
Army/family fit	-.14
Relocation adjustment	.22
Army Commitment	
Work satisfaction	-.21
Agreement/commitment to Army values	-.14
Spouse supportiveness of Army career	-.09
Unit Readiness	
Unit readiness	.19

Note.—All correlations are significant ($p < .05$, $N = 495$ units). Data from Sadacca, McCloy, and DiFazio (36, pp. 36-37).

support for Army policies. Over-all unit readiness was lower in units with more females ($r = -.18$), but the correlation was the same size as that between type of unit and unit readiness ($r = .19$, combat units had higher readiness).¹³ When unit readiness was predicted from all the independent variables, no significant direct or indirect effects of gender were observed.

¹³Correlations between percentage of females in the 495 units and the following variables were not significant ($p < .05$): number of months at present location, parent or guardian had served in the Armed Forces, number of dependent children living with soldier, number of dependent children at enlistment, unit personnel support, leader support for families, unit having activities for all family members, unit allowing time off for nonurgent family matters, marital happiness of soldiers, community support network, demands of family responsibilities, and work stress.

Furthermore, when Sadacca, Stawarski, and DiFazio (37) analyzed individual readiness data and gender, they found no relationship once they controlled for other individual soldiers' characteristics and unit factors. Bell, Scarville, and Quigley (9) have concluded from their review of the literature that females do not degrade unit performance. Unfortunately, to date the literature does not allow us to answer the question of what effect percentage of women *within combat units* might have on readiness factors for such combat type units. However, on the basis of research reported to date (cf. 31), it appears unlikely that having females within combat service-support units presents a substantial problem for military readiness within the context of the sorts of missions such units are exposed to in training or have been exposed to in contemporary military conflicts.

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APPENDIX

BRIEF SUMMARIES OF U.S. ARMY DATABASES ON PERSONNEL GENDER

Officer Master Files/Enlisted Master Files (OMF/EMF)

Each U.S. Army unit maintains its personnel data on a computer database known as SIDPERS, which includes basic demographic information that is pooled to form the OMF/EMF. One unusual limitation of the EMF is that no distinction is made between children and other adults (not spouses) as dependents; therefore, a divorced person responsible for the care of an elderly relative may be counted as a single parent. Nevertheless, the OMF/EMF provide the most comprehensive, up-to-date administrative information on active-duty members of any such database and form the basis for the DCSPER 46 report, the official Department of the Army printout on personnel strength used as a source for several of the secondary sources cited in Table 1 (1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 28) and as a basis for weighting many of the surveys conducted or sponsored by the Army.

Army Sample Survey of Military Personnel (SSMP)

The SSMP is an Army-wide survey, authorized by AR 600-46 and conducted for the HQ, DA, Deputy Chief of Staff for Personnel (DCSPER) semiannually in the spring and the fall by the Army Personnel Survey Office, located in the U.S. Army Research Institute for the Social and Behavioral Sciences, Alexandria, Virginia. The survey has been conducted regularly since 1943, first as the Personnel Survey of the Army and since 1958 as the SSMP. The survey contains a standard set of demographic items but does not appear to have been administered to soldiers stationed in combat zones (Korea, 1950-1953; Vietnam, 1964-1975; Desert Storm, 1990-1991). Soldiers are selected for participation by their commanders according to last digits of their Social Security numbers. Peterson (32) estimated that the survey response rate is between 50% and 60%. The survey is unique in its history, scope, and regularity.

The 1979 DoD Survey of Officer and Enlisted Personnel

The 1979 DoD Survey was conducted in March 1979 and represented all service members with five or more months of service as of that month, allowing it to be generalized to 94% of all Army personnel (29). The over-all response rate for Army personnel was 54%.

The 1985 DoD Survey of Officer and Enlisted Personnel

The 1985 DoD Survey was conducted for the Office of the Assistant Secretary for Defense for Management and Personnel by the Defense Manpower Data Center (DMDC). Nearly 5,000 Army officers and over 19,000 Army enlisted personnel returned usable questionnaires from a population of

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all active-duty personnel with at least four months' active duty as of 30 September 1984. Response rates for Army officers were 66.9% (males), 60.5% (females), and 65.2% (over-all); for enlisted personnel, response rates were 58.2% (males), 60.7% (females), and 59.1% (over-all). The lowest response rate obtained for any group in any service was for Army males with less than four years of service (53.4%) (26, 27, 29).

Since the survey was not mailed until February 1985 and final responses were not obtained until June 1985, the survey did not sample service members who may have left active duty before February 1985 or who may have entered active duty after September 30, 1984. The weighted data appear to accurately represent the DoD population with 10 or more months of active duty as of 30 March 1985 (27). Morrison, Vernez, Grissmer, and McCarthy (29) reported that the survey is generalizable to only 85% of Army personnel (which included 107,027 officers and 671,285 enlisted personnel on 31 March 1985) because of its restrictions and response rate.

The 1987 Army Family Programs and Readiness Study (RAND)

The RAND Corporation conducted a three-stage sampling plan survey involving 23 major Army installations in the United States, Korea, and Germany, with up to 40 units being selected at each installation to provide subjects. Surveys were administered initially by mail between May and November 1987 (11). The study did not sample soldiers in the junior enlisted grades of private (E-1 or E-2), those stationed outside Korea/Germany/the United States, or those not stationed at installations of fewer than 1,000 soldiers; these limitations reduced the sample's representativeness to 80% or less of the total Army. Ultimately, 6,014 soldiers and 3,143 spouses (including 2,458 couples) responded for response rates of 80% for officers and 78% for their wives, of 71% for senior enlisted soldiers and 58% for their wives, and of 65% for junior enlisted soldiers and 56% for their wives. However, very low response rates were obtained from Korea and two of the installations in Germany, so the overseas data may be less valid than the U.S. data. The over-all soldier response rate was 71%, but no figure has been reported for over-all spouse response rate (11).

The 1989 Army Family Research Program (AFRP) Survey

The 1989 AFRP Survey was conducted using a three-stage sampling plan. In October 1988, the U.S. Army Personnel Command (PERSCOM) identified 765,914 active-duty personnel in paygrades of E-2 through O-6 stationed in 1,150 locations throughout the world in 11,103 units. There were 121 Army locations that contained 1,000 or more eligible soldiers within 50 miles of the site, which represented 95% of all eligible personnel. Of the major locations, 43 were selected as sample sites, including sites in South Korea, Panama, Germany, the United States, Belgium, Italy, and Japan.

In the second-stage sampling frame, units were declared ineligible if nonoperational (transfer points, medical holding, confinement, trainees), if outside the 50-mile range, or if they had fewer than 20 members; thus, only 49% of the initial number of units were eligible. Of the 5,483 eligible units, 542 were selected for the survey, but 14 failed to participate (97% response rate).

In the third stage of sampling, 20,033 soldiers were identified. Of those, 28% were ineligible (confined, detached from unit, reassigned elsewhere, etc.) and of the remaining 14,371 only 77% agreed to participate for a total of 11,035 respondents to the soldiers' questionnaire. Soldiers' data were collected between February 1989 and December 1989 with names being redrawn from PERSCOM files about three months prior to administration of the surveys at each location. About 85% to 90% of married soldiers provided a name and address of their spouse. Spouses so identified were mailed a separate questionnaire between May 1989 and May 1990, with most instruments being returned by March 1990. Of the 6,321 spouses mailed a survey, 53% (3,345) responded.

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By Saul M. Genuth

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Women's Health Issues

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Women's health has been discussed as an issue, a specialty, a curriculum, and an entitlement, and in each of these contexts it has received an enormous amount of interest over the past several years. As an example, this is the first time that a chapter on women's health has been included in *Advances in Internal Medicine*. For this reason, an overview of the area of women's health is appropriate to highlight the genesis of the contemporary women's health movement, areas that are of concern to women, problems and obstacles that have been identified, and some proposed strategic solutions. A separate women's health specialty and a curriculum model to advance the possibility of its being established have both been proposed, and this debate will be summarized. A great deal of change is now happening in the area of women's health. However, those of us who have worked toward parity for women in all the contexts of women's health know that for everything that has been accomplished, far more needs to be done.

One of the first things that required change was the perception that women's health is solely reproductive health. For the past three decades, women's health has been focused only on maternal-fetal-obstetric issues, with a lesser emphasis on family planning strategies and programs. In the disease model that has been followed, the diagnosis and treatment of reproductively oriented health problems has been invisible. An explanation for this is that our medical system has been focused on a male disease model; clinical teaching, research, most clinical trials, the medications we use, and the results we expect have all been based on diagnosis, treatment, and outcome in the male. Now, in the 1990s, this narrow perception of women's health must be expanded. Health care issues involve women, and women's health is far broader than just reproductive health. To focus solely on women's

reproductive role makes women's health equivalent to maternal health.

Women's health care policy, planning, research, and practice must extend beyond those diseases that affect only women. The focus must expand beyond the traditional areas of family planning, contraception, and childbirth to include all conditions that cause significant morbidity and mortality in women. Women's health, in all contexts, must conceptually extend beyond the reproductive years, in both directions. The seeds for the physical and emotional health of adult women are sown in childhood, where gender differences in diet and exercise may have an impact on bone density later in life and unequal educational opportunities in childhood and adolescence may undermine self-esteem in the adult. Fully one third of any woman's life is lived after menopause. Thus a narrow focus on women as reproductive units is inappropriate as a basis for the development of a health policy. The elucidation, expansion, and extension of this concept have been the focus of much attention and activity for the past several years.

Change has been occurring in women's health needs and women's use of health services. Women are increasingly interested in more in health care decisions, they are increasingly interested in reproductive options and alternatives, and they understand that control of their reproduction is essential to control of their life choices. Over 80% of women work outside the home. Family structure is more fluid, women have greater participation in the workforce, they live longer than men, they are demanding more information about health, and they are having more impact in health care decisions.

Another change is occurring—the realization that women are not all alike. Within this country are diverse cultures, many of which mix little if at all with other cultures. There are African-American women and Hispanic and Native American women. Just as women are not all the same, their health problems, needs, and medical solutions are not identical. "Women" should be defined as a large, heterogeneous group that includes women of color, immigrant women, women with disabilities, women still in adolescence, women who are postmenopausal, and those women who are homeless. Diversity among women must be recognized. Much as a male model of disease cannot be used for a sick woman, a middle-aged white model cannot be used for a black teenager. Psychosocial issues mold and change the context of specific medical problems; issues such as racism, sexism, gender role, violence against women, and poverty affect health and health care. The intricate in-

teraction of biology and psychology across different cultures demands that both be examined by qualitative research and cross-disciplinary studies. For example, it makes little sense to work toward prevention of human immunodeficiency virus (HIV) infection without first understanding the sexuality of a culture. Researchers might understand the metabolism of alcohol, but they have not yet established the drinking patterns of women.

We were taught that health care is the aggressive diagnosis and cure of disease, and this is how we practice medicine. The contemporary women's health movement is teaching us that this concept must change and broaden. The evolving concept is that health is wellness, which involves not only health promotion and disease prevention but also the realization that understanding psychosocial issues and behavioral sciences is involved in providing depth and continuity to health care.

A BRIEF PAST HISTORY

On June 18, 1990, the General Accounting Office (GAO) reported to Congress on the failure of the National Institutes of Health (NIH) to implement its policy to encourage the inclusion of women in clinical trials. This was a red letter day, which to some marks the starting date of the contemporary women's health movement. However, much backgrounded the publication of this report.

In 1983, according to Dr. Ruth Kirschstein¹ (former acting director of the Office of Research on Women's Health and Director of the National Institute of General Medical Sciences and recently acting director, NIH), the assistant secretary for health established a Public Health Service Task Force on women's health issues. A two-volume report was prepared, the first volume published in 1985² and the second published separately for the Department of Health and Human Services in October 1987. This report discussed a broad array of women's health issues across the life stages, particularly in the context of the sociologic changes taking place in the United States. One of the most important recommendations in the task force report was that "biomedical and behavioral research should be expanded to ensure emphasis on conditions and diseases unique to, or more prevalent in, women in all age groups."²

In 1986 the NIH established a policy to encourage the inclusion of women in clinical research. In December 1989, Representatives Patricia Schroeder and Olympia Snowe, coauthors of the Congressional Caucus for Women's Issues, and Representative Henry Waxman requested that the GAO investigate the operative policy

of the NIH as to whether women were included or not in clinical investigations and NIH clinical trials. The observation had been made that women had been routinely excluded from many studies, such as the U.S. Physicians' Health Study,³ which looked at the effects of aspirin on heart disease in 22,000 male physicians, and the Health Professionals Follow-up Study,⁴ which analyzed the association between coffee consumption and heart disease in 45,589 men. As another example, the Multiple Risk Factor Intervention trials ("MR. FIT") studied cholesterol levels and mortality from coronary heart disease in 12,866 men and included no women.⁵ When the GAO report was made public on June 18, 1990,⁶ there was considerable evidence that gender disparity was widespread.

The GAO testified before the Energy and Commerce Subcommittee on Health and the Environment, chaired by Representative Henry Waxman. The GAO report concluded that implementation of the policy first announced in October 1986 was slow and inconsistent and not followed throughout the NIH. The policy had not been communicated to the scientific community and was not applied when reviewing grants for funding. Women were only included in extramural research, meaning that trials and studies at the NIH itself, the intramural campus, were outside the policy. The report stated that "(the NIH) has made little progress in implementing its policy to encourage the inclusion of women in research study populations."⁶ Furthermore, gender analysis within studies had been ignored. Since the NIH had not collected any data on the actual inclusion of women in clinical studies, demographic data were unavailable, so any compliance or implementation could not be tracked for verification purposes. Representative Waxman inquired of Acting NIH Director William Raub whether an office on women's health should be established at the NIH. Acting NIH Director Raub answered "... at this stage, I think it would be premature to speculate about whether a specific organizational change would be necessary."⁶

Representatives Schroder and Snowe, at this same hearing, discussed plans to introduce omnibus legislation to improve research on women's health, the previously mentioned Women's Health Equity Act. Representative Schroeder's testimony also included recommendations to establish an Office of Research in Women's Health, to require the appropriate inclusion of women and minorities in research studies funded by the NIH, to establish a program in obstetrics and gynecology at the NIH, and to advance women to senior positions at the NIH.

The GAO report was publicized by the media and became a rallying point for many different special interest groups. Of particular importance at this time were the efforts of Dr. Florence Hacteltine, Director of the Center for Population Research at the NIH, to enlist support for all programs promoting the advancement of women in medicine and science. With a small group of similarly interested friends she founded the Society for the Advancement of Women's Health Research (SAWHR).

Shortly thereafter, the Congressional Caucus for Women's Issues began to draft the Women's Health Equity Act, and on July 9, 1990, a "Dear Colleague" letter was sent to members of the House asking them to cosponsor this act. In the same month, a hearing entitled "Women Health Care Consumers Short-Changed on Medical Research and Treatment" was chaired by Representative Marjory H. Holt of the Select Committee on Aging. At this hearing, Acting Director Raub testified that "we ... believe that the NIH system is not badly out of focus, but instead needs only some fine tuning."⁷ In July and August 1990, the Women's Health Equity Act was introduced both in the House and in the Senate by Senator Barbara Mikulski, additional hearings were held on women's health provisions, and finally, congresswomen and Senator Mikulski requested a meeting with Dr. Raub, Health and Human Services Secretary Louis Sullivan, Surgeon General Antonia Novello, and Dr. Ruth Kirschstein at the NIH to discuss their concerns about women's health. On September 10, 1990, Dr. Raub announced the creation of the Office of Research on Women's Health (ORWH) at the NIH.

This was a most significant milestone. The mandate of ORWH has been to strengthen and enhance the prevention, diagnosis, and treatment of illness in women and to enhance research related to diseases and conditions that affect women. The Office of Research on Women's Health was charged with three critical objectives: first, to ensure that in the performance of any research supported by the NIH, the important issues that pertain to women's health are adequately addressed; second, to ensure appropriate participation of women in clinical research, particularly in clinical trials; and third, to foster the increased enrollment of women in biomedical research, particularly in pivotal decision-making roles.

At this time the influence of the SAWHR was also coming to bear on Congress, the media, and women's groups. Officially established in early 1990, the mission of the society has been to bring attention to serious shortcomings and unmet needs of women's health research in the United States. Identified inequities ranged

from failure to include women in clinical trials to inadequate attention to the analysis of gender differences in medical research. Insufficient funding for research on women's health concerns, and the death of senior women in the medical and scientific communities. Such inequities, although commonplace, arguably put the health of American women at risk. Thus the work of the society was to be guided by five basic goals:

1. To identify those areas of research that will have an impact on the health of women
2. To promote and encourage financial support, both public and private, for women's health research
3. To effect changes in policies and behavior to improve the health of women based on research outcomes
4. To create a milieu for change by informing policy makers, the public, educators, and other professionals of research outcomes
5. To advance women as leaders in the health professions with the intent of increasing research in women's health and improving the health of women

In April 1991, SAWHR convened its first Scientific Advisory Meeting. SAM I. Representatives from 25 medical specialties and professional organizations testified to society members and to government, media, and community leader observers with the purpose of identifying women's health problems and the priorities for women's health research. Biomedical health issues and psychosocial issues were enumerated, but in addition, the areas of leadership roles for women, the education of health care professionals, and problems in the health care delivery system were brought to the attention of the society. The proceedings of the meeting were published⁹ and widely circulated to congressional staffers, medical societies, and medical school administrations.

As women's health rapidly became the focus of many different groups, the year 1991 saw a great deal of activity in the political, scientific, and research arenas. Dr. Bernadine Healy was confirmed as director of the NIH. Congresswomen requested a conference on women's health to gather the opinions of the medical community, women health advocates, researchers, and key staff of the appropriate federal agencies to decide what steps could and should be taken. An NIH task force was established, and a workshop entitled "Opportunities for Research on Women's Health" was held September 4 to 6, 1991, at Hunt Valley, Maryland. The proceedings of this conference have also been published,⁹ and the recommenda-

tions constitute the foundation for the NIH-wide research agenda to attain significant progress against the diseases and disorders that place a particular burden on women. In October 1991, the Women's Health Initiative was announced by NIH Director Healy, and Dr. Vivian Pinn was appointed as director of ORWH. During the fall of 1991, the SAWHR held roundtables around the country to take the issues raised in SAM I to the community for validation of their accuracy and completeness and to define priorities. In December 1991, the *Journal of Women's Health* was created by Drs. Florence Haseltine, senior editor, and Anne Colston Wentz, editor-in-chief. In 1992, ORWH convened a task force on the "Recruitment, Retention, Reentry and Advancement of Women in Biomedical Careers." In March 1992, the House passed the fiscal year 1993 budget resolution, which included an increase of 500 million dollars for research on women's health. In addition, ORWH embarked on a study of medical schools to ascertain how, how much, and in what context women's health is taught.

Through much of 1991 and culminating on October 5, 1992, when it was finally pulled from the Senate floor, the NIH reauthorization bill (H.R. 2507) became the symbol of hope for women's health. This bill proposed to institutionalize ORWH, permit the use of fetal tissue in federally funded medical research, establish a data system on women's health research, create an intramural laboratory and clinical research program for gynecology at the NIH, authorize additional funds for breast and gynecologic cancer research, expand acquired immunodeficiency syndrome (AIDS) research, establish research centers on contraception and infertility, permit studies and surveys of human sexual behavior, provide federal protection against break-ins to animal research facilities, mandate the inclusion of women in clinical trials, and provide much else of broad general interest. The bill was passed by the House 260 to 148 on May 28, 1992, and by the Senate 85 to 12 on June 4, 1992, and vetoed by President Bush on June 22, 1992. Dr. Healy wrote that many of the provisions were an intent to "micromanage" the NIH and lost much of the support she had gained with the Congressional Caucus for Women's Issues by upholding the president's veto. The House failed to override (272 to 156), and a new bill (S.2899) was introduced by Senator Edward Kennedy with modifications of the fetal tissue research provisions, but it was finally pulled on October 5, 1992, when compromise could not be reached over the use of tissue from induced abortions.

Also in October 1992, in response to a request by members of Congress, the GAO issued a report¹⁰ concluding that the Food and

Drug Administration (FDA) should ensure that prescription drug testing includes more study on the different effects on men and women. The report found that in one third of drug tests, too few women were included to determine whether they responded differently from men. The report stemmed from an FDA policy developed during the late 1950s that excluded and restricted women of childbearing age from participating in new drug studies. The policy stemmed from good intentions after thousands of babies were born with severe deformities because their pregnant mothers used the sleeping pill thalidomide. However, the policy resulted in the exclusion of women of childbearing age from drug trials, thus effectively preventing research studies and outcome analyses despite the fact that these women were being medicated with these drugs. The policy did not include fertile men. Furthermore, the policy prevented the inclusion of even nonfertile reproductive-age women and prevented researchers from learning the optimum doses and potential side effects unique to women. The GAO report concluded that gender-related differences in response do exist for some drugs and that drug trials must include sufficient numbers of women to permit analysis of gender-related differences in drug response. There was a particularly low representation of women in cardiovascular drug trials, and in general, the participation of women fell below the suggested minimum for some drugs. Fewer than 50% of the drugs investigated were analyzed for gender-related effects. In April 1993, the FDA announced that it was lifting the ban on the inclusion of women in clinical trials.

The Clinton administration has been responsive to women's health issues. Health care reform is imminent, and Hillary Rodham Clinton has stated that women will be on a par with men and that women's health issues are of major concern in the establishment of the new health care policies. The administration has to date been supportive of women, reproductive rights, and freedom of choice. President Clinton, in June 1993, signed a reworked S.2899 that gives statutory authority to establish ORWH, thereby ensuring its permanency, and mandates the creation of an intramural program of obstetrics and gynecology at the NIH. Work that began during the 1980s is beginning to pay off in increased attention and increased funding.

For example, in 1993 an estimated \$805 million for women's health, including \$210 million for breast cancer research, was passed by Congress. The Congressional Caucus for Women's Issues has released the 1994 budget request asking for \$1.05 billion for women's health research and services, including an additional \$67

million for breast cancer research and other programs at the NIH. These requests represent a 31% increase over the 1993 budget and 81% over 1992.

A history such as this is necessarily incomplete. However, it attempts to convey the rapidity with which women's health has become the focus of attention of health care policy makers. Congress, the medical establishment, and women in general. What then is women's health?

A WOMAN'S DEFINITION OF HEALTH

As suggested earlier, the definition of health has changed. In the past the concept of health has been based on a disease model in which good health is defined as the absence of sickness or disease. The concept has evolved that good health is physical and emotional wellness. This implies that our activities in the area of health must be as involved in health promotion and disease prevention as they have always been in disease detection and elimination. The definition of women's health is therefore far broader than that of solely reproductive health, and this definition also includes the impact of psychosocial, cultural, and behavioral influences. The target of research in women's health is also broader and involves not only biomedical basic and clinical investigation but also embodies psychosocial and behavioral research that must be conducted in conjunction with more traditional research efforts. Acceptance of these new and broadened definitions is crucial to forward progress of the women's health movement as it works to improve the health and health care of women. With health care reform and with assurance from the administration of parity for women with men, these broadened definitions take on new meaning.

WHAT ARE THE AREAS OF CONCERN TO WOMEN?

Women may live longer than men, but they do not necessarily live better. There is ample documentation that women requiring nursing home care outnumber men by an estimated three to one and that they are sicker than men at any age, have more disabilities, are bedridden more, and have activities limited for more days of the year than those of men. They require more visits to the doctor, more prescriptions, more medications, and more chronic care. They have more affective disorders, and their rate of depression is more than three times that of men. They are the subjects of more abuse, battering, and violence than are men. Overall, women are more susceptible to disease, have worse health, and are affected

by certain diseases differently from men, which makes their situation uniquely problematic in view of the prevalence of our male model of disease.

As mentioned before, in 1991 the SAWHR convened representatives from many of the nation's medical societies to elicit information about areas of health of most concern to women. A broad range of specialization was included, with testimony heard from members of surgical, medical, family practice, psychiatric, gynecologic, dermatologic, and nursing specialties. Each representative was asked to list the top three areas in his or her specialty that affected women's health and to make recommendations as to what research efforts should be directed toward these areas. The findings were analyzed, and topics mentioned were classified as either biomedical or psychosocial for the purposes of organization. However, in subsequent discussions it was understood by all participants that interactions between the biological, psychological, and social issues that have an impact on medical problems must be considered. The following is a list of biomedical health issues compiled by the medical specialty representatives.⁶

BIOMEDICAL ISSUES

Cardiovascular Disease in Women

Heart disease is the leading cause of death for both men and women in the United States. However, heart disease is widely regarded as a male illness, even though it kills 20% more women than men. Almost all of our knowledge is based on a male model since most of the studies have been conducted predominantly or exclusively in middle-aged men. In women, heart disease occurs later in life, predominantly after menopause, with a 10- to 15-year lag in the development of morbidity and mortality from coronary heart disease compared with men. Nevertheless, decisions regarding prevention, diagnosis, risk stratification, medical and surgical therapies, and prognosis of coronary heart disease can only rely on data derived from studies in men. Major differences can be found in the seriousness of coronary disease between various ethnic and racial groups of women, but research directed at finding the explanations has yet to be done. The reason for the delayed onset in women is unknown, and the role of hormones needs to be elucidated. Risk factors need to be investigated, and reliance on studies performed in men will not suffice. Lipid levels in men and women have different prognoses, and although any exercise is beneficial for men, exercise has little effect on coronary disease incidence in women.

Studies of risk stratification cannot be translated from men. Prognosis must be evaluated separately because women with coronary heart disease survive more poorly than men; the lag in diagnosis may or may not explain the difference. Hypertension, a major risk factor in cardiovascular disease, is two to three times more common in women than men and is extremely high among African-American women. It carried a twofold to threefold increased risk of stroke, but it is unknown whether there are gender differences in the occurrence of systolic hypertension or gender differences in the efficacy and side effects of recommended treatment.

The most interesting aspect of coronary disease in women is the lack of appreciation of its importance. Women do not fear a heart attack as do men, and heart disease pales in importance to breast cancer, which has been surpassed by lung cancer as the major cancer killer of women.

Cancer in Women

Cancer is the most feared but not the leading cause of death in women. For all women, cancer is the second leading cause of death, although in certain populations AIDS has assumed first place, dropping cancer to third. The diagnosis of breast cancer has slowly climbed over the past 30 years, rising 32% since 1982 to an estimated 175,000 new diagnoses this year. In contrast, the death rate per year over this time period has remained remarkably stable. Breast cancer will be diagnosed sometime during her lifetime in one of every eight women in this country. About 80% of women with breast cancer are over the age of 50, and the median age for diagnosis is 63 years. Improvements in mammography and other diagnostic methods can be expected; identification of the gene for certain forms of breast and ovarian cancer on chromosome 17 will permit establishing a very accurate prognosis for some women. Some risk factors are known, and history alone will identify those with cancer in the family, particularly in first-degree relatives, pre-existing benign fibrocystic disease, obesity, caffeine intake, and supplemental sex hormone therapy. However, most women will have to accept that they themselves are at risk for the development of breast cancer since so little is known about the etiology of the disease and the significant risk factors. Thus far, about 70% of the women who have been newly diagnosed with breast cancer have none of the identifiable historical risk factors.

A great deal needs to be learned about breast cancer in women. Research at the cellular and molecular level must continue to identify mechanisms of tumor development and the process by which

tumor dissemination occurs. Growth factors, oncogenes, tumor promoters, and stimulating hormones must all be identified. In addition, information is needed about environmental risk factors, and better means of diagnosis and screening must be developed.

The problem with lung cancer is that it is not believed or accepted as the leading cause of cancer deaths in women. Furthermore, lung cancer is preventable. Cigarette smoking accounts for 75% of lung cancer cases in women. The death rate from lung cancer has risen more than 100% since the early 1970s, and virtually all of this increase can be correlated with increased rates of smoking by women. Targeting of specific populations by the tobacco industry has led to an increase in teenage boys in start-up rates; females for the first time surpassing teenage boys in start-up rates; in addition, marketing has led to increased smoking in reproductive-age and even older women. Smoking prevention efforts have not focused on women, and traditionally, women have not succeeded in smoking cessation as have men.

Cancer of the colon and rectum ranks third in cancer deaths in women and is three times higher than death from uterine (cervical plus endometrial) or from ovarian cancer. Whereas uterine and cervical cancers are readily detected and diagnosed and result in fewer cancer deaths and higher cure rates, ovarian cancer is relatively rare, with 20,700 cases diagnosed in 1991, but is generally fatal. The 5-year survival rate is low, metastasis is common, and the disease is usually not detected early in its course. With the possibility of genetic screening for risk stratification comes the dilemma of prophylactic oophorectomy; however, even this advance will not detect most cases, so better means of screening must be found.

Malignant melanoma is increasing faster than any other cancer and is now more common than either ovarian or cervical cancer. Both the incidence and the mortality rate are on the rise in women, who predominate over men 3:2 between the ages of 20 to 29, where melanoma is the most common cancer, and 2:1 between the ages of 30 to 39, where it is second only to breast cancer. Differences in gender incidence are unexplained, as is a survival preference for women.

Diseases of Aging: Osteoporosis, Arthritis

Osteoporosis, which affects 50% of women over the age of 45 and 90% of women over 75, is a common cause of significant morbidity and disability. Osteoporosis causes over 1.5 million fractures of the hip, vertebrae, wrists, and other bones per year at a cost of 8

billion dollars in health care. The disease causes pain, deformity, impaired mobility, and loss of independence. Of the 250,000 hip fractures per year, about 80% are in women; mortality in the first year after a hip fracture is increased by 20%, causing about 50,000 deaths, mostly as a result of respiratory and infectious problems in the 4 months following the fracture. Approximately 15% to 25% of women who were functioning independently before the fracture require institutional care, and 20% to 25% require additional assistance at home.

Since osteoporosis is not curable, the goal must be prevention and, failing that, early diagnosis. Risk factors can be identified. However, those in their early 30s have shown little enthusiasm for preventive aspects such as paying attention to enhancing peak bone mass; a disease that manifests itself in the 70s and 80s has little immediate reality for a younger individual. Bone loss accelerates after menopause, and estrogen replacement can prevent or at least retard this loss, but the risks and benefits of supplemental treatment must be weighed on an individual basis.

A major problem is that the very women who will be affected have little understanding of the disease and its impact, as shown by a Gallup poll conducted for the National Osteoporosis Foundation. Therefore an important first step in approaching the problem of osteoporosis is educating women about its prevalence, prevention, detection, treatment, and morbidity.

Osteoarthritis, or degenerative joint disease, is thought to affect 15.8 million people, is most common in the aging population, and affects over twice as many women as men. Rheumatoid arthritis is found in women three times more often than in men and affects almost 5% of women over 65 years of age. Both of these diseases cause pain, deformity, disability, and loss of independent function and increase health care costs.

Urologic Disorders

More diapers are sold in the United States to women over the age of 65 than to mothers for their babies. Urinary incontinence affects as many as 3 to 4 million older women and is the tenth leading cause for hospitalization. Women are more affected than men, and approximately 50% of nursing home residents are incontinent. The total economic burden of urinary incontinence has been estimated at 1.8 to 8 billion dollars a year, but the psychological cost, in terms of isolationism and fear of embarrassment, cannot be ascertained.

In general, female urologic problems are a major cause of visits to physicians. Urinary tract infections are far more common in

women of all ages than in men and account for an estimated 8 million physician visits per year at a cost of 4.4 billion dollars. Little is known about urologic disorders in women. There are few female urologists in this country and not a great deal of interest in the problem of incontinence. A failure on the part of physicians to understand the painful chronic inflammatory condition interstitial cystitis has led to the formation of a special-interest group to draw attention and to increase research funding. Research in women's urologic disorders lags far behind that of prostate disease or bladder cancer in men but is crucially needed to assess predisposing factors and to find cures and rehabilitation methods to keep women out of diapers.

Immunologic Disorders and Autoimmune Diseases

Almost all autoimmune diseases are more commonly found in women, with a 9:1 ratio, and 10% of the American population has some form of autoimmunity. Lupus erythematosus affects women ten times more frequently than men and African-American women three times more than white women. Of all lupus patients, over 90% are women between the ages of 15 and 45 years. Chronic fatigue syndrome, also thought to be an immunologic disease, affects 1 to 5 million people in the United States, over 60% of whom are women. Autoimmune thyroid disease is also more prevalent in women and is frequently diagnosed during pregnancy or postpartum. Autoimmune oophoritis results in premature ovarian failure; although it affects only a small number of women, it causes infertility as well as extensive morbidity from premature osteoporosis, vaginal atrophy, and deteriorations in the quality of life for affected women.

Acquired Immunodeficiency Syndrome

Still almost unrecognized as a major killer of women, in New York City and in the state of New Jersey AIDS is the leading cause of death among reproductive age women; the risk of contracting AIDS is increasing so rapidly that it is expected to be the major cause of death among all young American women in the next decade. More than 32,000 American women are reported to have AIDS, but this number is thought to be low because many women are presently undiagnosed.

Until recently the majority of HIV-infected women became so by using injection drugs. The dramatic current increase in women diagnosed with AIDS is due to heterosexual transmission from infected men. Women are more likely to become infected than men by having sex with an HIV-positive partner, but ironically, AIDS

is still considered a disease of gay white males. In women AIDS is a disease of heterosexual women, who are predominantly minority, most being black or Hispanic. They may be drug users but more likely are part of or close to the drug culture. An HIV-positive woman or a woman who has AIDS is likely to have dependent children, to be on welfare, and to have inadequate access to health care facilities. Two gender-specific opportunistic diseases can provide early clues to HIV infection. Vaginal candidiasis is more frequent and more severe in HIV-positive women, and aggressive cervical carcinoma has been identified as an unusual but detectable sequela. Pelvic inflammatory disease, genital warts, and severe herpes infections also occur among HIV-infected women, and since the risk of becoming infected with HIV is increased if one has a sexually transmitted disease (STD), diagnosing the STD may be a signal to test for HIV positivity. As a corollary, controlling STDs is crucial to preventing the spread of AIDS.

Far less is known about AIDS in women than in men. It represents yet another condition in which women have not been included in clinical trials. The AIDS Clinical Trial Group, in data analyzed through December 1990, showed that of 11,909 persons included in clinical trials and coded by gender, only 801 (6.7%) were women. In 1992, 1 of 6 newly diagnosed cases was female, yet research in women has lagged behind that in men. Presently, the National Institute of Allergy and Infectious Diseases (NIAID) is supporting three clinical trial networks as well as basic research. Although no NIAID-sponsored studies exclude women, some sites have experienced difficulty recruiting and retaining women in clinical studies; the Patient Care Committee of the AIDS Clinical Trials Group (ACTG) has identified such barriers as lack of access to health care facilities, inability to afford the care or transportation to the facility, and other equally obvious obstacles.

Infectious Diseases: Sexually Transmitted Diseases

Sexually transmitted diseases occur predominantly in young people and among minorities, are more common in men than women, and are diagnosed at an enormous rate, some 12 million cases per year. In women, however, the potential sequelae from STDs have an impact on all aspects of reproductive health; pelvic inflammatory disease leads to infertility, chronic pelvic pain, and ectopic pregnancy, but it also decreases the contraceptive options available and increases perinatal morbidity and mortality. The incidence of primary and secondary syphilis is on the increase, Chlamydia infection has surpassed gonorrhea as the leading bac-

terial STD, more resistant strains of gonorrhea are being reported, viral STDs (herpes, HIV, human papillomavirus, hepatitis B virus, among others) are increasing in prevalence and are not curable, and all have a major impact on women's health.

Reproductive Health

Reproductive health is a woman's problem. Women's concerns extend beyond contraception and abortion to adequacy of prenatal care, prevention of prematurity, perinatal loss, and maternal mortality. It is the ability of a woman to control her reproduction that permits her to enter the work force, to continue to hold a job, and to become economically independent. The problems of teenage pregnancy, inadequate contraceptive choices, and lack of education at all levels contribute to the continued high number of abortions performed in this country. Approximately 60% of U.S. women of reproductive age use contraception, but fewer than half are satisfied with the available methods. Sterilization is the leading method of birth control among married women who have finished their families. For men, contraceptive choice is limited to either condoms or vasectomy. Contraceptive choices must be expanded through the appropriate research directions; postcoital contraceptives, medical abortifacients, and other contraceptive approaches must be developed. We need to understand the sexual attitudes and behavior of Americans and how these can be modified before we can expect to develop effective prevention strategies with respect to unintended pregnancy and STDs.

Other Conditions

Temporomandibular joint disease affects women more so than men. Migraine headache affects 23% of Americans, including 5.6 million men and over 18 million women, and is one of the most common reasons for seeking medical attention; it ranks seventh among reasons for outpatient visits and results in 18.3 million visits per year. Migraine has yet to gain acceptance as a valid disorder, and 50% of sufferers are not in treatment. Old age is another condition that affects more women than men because women live longer. For older women, the life expectancy has increased at a faster rate than for men. In 1978, the life expectancy for women was 70 years; in 1988, female babies could expect to live 78.9 years, about 7 years longer than men.

PSYCHOSOCIAL ISSUES

Psychosocial issues disproportionately affect women and are or contribute to health problems as important in impact as the dis-

eases and conditions discussed earlier. Some of these can be characterized as mental health issues, including depression and eating disorders, and others, which predominantly occur in women, can be considered addictive behaviors. Violence against women is a critical public health problem of our society. Violence causes both emotional and physical injury, cuts across all disciplines, and affects women totally out of proportion to men.

Mental Illness

Depressive disorders are unappreciated in terms of the degree to which they affect women. Depression is a major public health problem and contributes to significant morbidity and mortality, particularly among the elderly. One in four women will experience a major form of depression at some time in her life. Women are twice as likely as men to suffer from clinical depression, and 15% of women who have a major depression will commit suicide each year. There are, in this country, at least 7 million women with diagnosable depression, and of those who experience clinical symptoms of depression, about 75% are untreated. Although drugs are quite useful and successful in therapy, their effects vary during the course of a woman's menstrual cycle, they interact with other medications such as oral contraceptives, and they have usually been tested only in men since reproductive-age women were excluded from clinical trials of such medications.

Depression is a major problem in older women, in whom the prevalence of mild depression is estimated to be 50% to 60%. Although the gender difference disappears in older people, a substantial proportion of the depressed population is female since 60% of the population over 65 years is female. Biological, psychological, and sociologic factors can be shown to contribute and interact, with enormous cost to society; escalation of health care costs occurs via repeated office visits, chemical dependency, and institutionalization. Recognition and research are both required to develop appropriate assessment and intervention.

Eating Disorders

Anorexia nervosa and bulimia nervosa are syndromes that occur almost exclusively in females. Anorexia is the most serious of the two, with about 5% to 7% of affected girls or women dying of cardiac, infectious, or metabolic complications of the condition and another 2% to 5% committing suicide. About half of anorectics have psychological impairment at a 2-year follow-up visit, and the majority never totally stop some type of abnormal eating pattern.

Bulimia has less serious sequelae but should still be regarded as a significant eating disorder.

Alzheimer's Disease

Alzheimer's disease affects a preponderance of women only because women live longer. It is the most common cause of primary degenerative dementia and leads to total global impairment of mental functioning in an otherwise awake and alert person. The emotional and economic costs of caring for people with Alzheimer's disease are enormous and have a great impact on women because women are the most frequent care providers.

Addictive Behavior and Substance Abuse

Substance abuse and addiction (including alcohol, nicotine, prescription drugs, and illegal drug dependency) affect people of all ages and both sexes, but the number of women and the extent to which women are particularly affected are elusive. Certain drugs are consumed almost solely by women, for example, tranquilizers, which are taken by women 2.5 times more often than by men, and psychotropic drugs, where two thirds of the prescriptions are for women. Of the 10 million alcoholics in the United States, 30% to 50% are women. The impact of alcohol extends beyond the consumer, as evidenced by a disturbing prevalence of fetal alcohol syndrome. Alcohol use in pregnancy is greatest in single women, smokers, the least educated, and the youngest, exactly those at highest risk for a poor pregnancy outcome. Alcohol also increases the risk of breast cancer and heart disease in women. Women use all types of recreational and illicit drugs, but less frequently than men do, although most drug use in women occurs during the childbearing years.

Smoking is a particularly troubling form of addictive behavior in women. Because of aggressive marketing techniques, more teenage girls than boys are now initiating smoking, a habit that is more likely to be continued by them since cessation for males is more successful. Tobacco use has been identified and widely publicized as the single most preventable cause of death and disease, yet after the age of 25, one in three women smokes, and the percentage of heavy smokers has increased.

Violence and Abuse

Two to 4 million women are physically battered each year by their partners. Four women die daily from battering. Every 15 seconds a woman is beaten in her home. Batterings are the most frequent reason that women come to emergency rooms, and 21% of all women using the emergency departments in the United States are battered.

Wife abuse, which accounts for half of all the injuries in women in an emergency department setting, causes more injuries than automobile accidents, muggings, and rape combined; however, only 4% are recognized as abuse. Violence against women is responsible for 50% of the suicides in black women and for 25% of the suicides among all women. The prevalence of wife abuse is estimated to be from 26% to 29%. Twenty-five percent of all obstetric patients are abused women. Homicide rates are also rising, and one in three female homicide victims is murdered by a past or present male partner. Nevertheless, violence is one of the most poorly understood and most poorly avoided causes of health problems.

Abuse of the elderly by family members and in chronic care facilities has gained the attention of the media, but few data are available.

WHAT ARE THE PROBLEMS AND OBSTACLES?

In 1991, when SAM I was convened by SAWHR, those biomedical and psychosocial issues of most importance to women were identified. The findings are summarized in the previous pages, and their publication received widespread distribution. Next, the Society sought to learn from women themselves whether they agreed with the published findings from SAM I and what they perceived were the major problems and obstacles. Women from the medical, health, and lay communities in three quite different cities met for discussion. There were several recurrent themes, including an overriding recognition of problems of access to and delivery of health care and problems of gender disparity and discrimination; the proceedings were published.¹¹ Later, the Society in conjunction with the Center for Research on Women and Gender at the University of Illinois cosponsored a conference entitled "Women's Health Research: Opportunities and Strategies for Change," during which participants from a variety of disciplines and affiliations synthesized input from scientific and consumer hearings and began to develop concrete guidelines for solutions to the identified problem areas. The following summarizes what was learned and proposed at these meetings.

ACCESS TO HEALTH CARE

Access to health care has been defined as a measure of the "potential and actual entry of a given population group into the health care delivery system."¹² Factors that determine access include the need for health services, their availability, the ability to obtain these services, and their acceptability on several levels. Access can

be limited by the level of education and information about the services, by financial and insurance status, and by physical situations, including the availability of transportation to a facility. Women use health services more frequently than men, but it is unclear whether this is a result of greater illness, greater perceived need, or greater availability of services for women (family planning, prenatal clinics). Women take responsibility for the family's health, and although this role enhances the interest of women in health, it does nothing to improve access. The barricades to health care are many and diverse, and much needs to be done to identify and eliminate as many of them as possible.

Health care provider issues also represent a barrier to health care. These range from a simple lack of trained personnel, particularly to perform abortions and provide family planning, to more subtle problems such as provider insensitivity, disrespect, and ignorance. Women with physical disabilities are poorly served, as are others such as lesbians, the elderly, and the emotionally ill. Teaching and training is poorly developed, for example, in relevant areas such as spousal abuse and violence, the prevalence and reality of alcoholism and substance abuse, and even the recognition of the different manifestations of AIDS in women. "Grassroots" providers are underused, and community resources such as respected lay midwives who could be retrained are generally totally ignored in community health planning. Roundtable participants emphasized the need for a new look at the obstacles and barriers, the requirement of new insights into overcoming them, and the utilization of research into the efficacy of the solutions, a form of outcome analysis.

GENDER DISCRIMINATION IN HEALTH CARE

Gender discrimination in health care includes two areas: that of unequal access for women as compared with men in terms of diagnostic and therapeutic care and that of unequal access for women to leadership roles in science and medicine. Some have said that solving the second would solve the first.

Recently, many examples of gender discrimination in health care have been publicized. Most of these involve access to clinical diagnostic interventions and inclusion in clinical trials. Women have fewer tests and diagnostic procedures than do men when confronted with the same diagnoses in such documented areas as kidney dialysis, lung cancer, and coronary heart disease. Women do not have equal access to coronary angiography and revascularization; however, once these procedures are performed and a diagno-

sis is made, women usually receive surgical therapy at the same rate as men. This is not so for cardiac transplantation, although a careful analysis of the data suggests other confounding variables than simply gender discrimination. For example, of 2,700 cardiac transplants performed in 1992, 81% were done in males.¹³ However, among all persons offered the procedure, 29% of women vs. only 9% of men decided against the surgery for reasons such as unwillingness, their more advanced age, and perhaps their insurance status. That the option of surgery could have been presented differently, that women had unequal access to diagnostic intervention at a younger age, and that disparity in insurance coverage is discriminatory are arguments on the other side of a clearly complex issue.

Sometimes the explanation for gender discrimination involves a lack of appreciation of the difference and manifestations of many diseases in women as compared with men. For example, although coronary artery disease is the leading cause of death in women, with 500,000 women dying each year, coronary artery disease is treated far less aggressively in women than in men. Women experience chest pain as their chief complaint more frequently than men, but fewer women are referred for noninvasive screening or testing for coronary artery disease. Physicians attribute anginal symptoms in women to noncardiac causes and consider angina benign because in women undergoing coronary arteriography for chest pain, normal coronary arteries are found more often than in men. Men were ten times more likely to undergo cardiac catheterization,¹⁴ but the authors were unable to conclude whether cardiac catheterization and coronary bypass surgery were underused in women or overused in men. In any event, women report more cardiac disability than men before their infarction but are less likely to undergo procedures known to lessen symptoms and improve functional capacity. A lack of appreciation of gender differences in general may be an educational issue and not a deliberate bias, but it is a major problem nonetheless.

Another example of disparate health care occurs with AIDS, where far less information is available concerning women. As previously stated, AIDS has recently become the most common cause of death in reproductive-age women in certain locations, and it affects all women including the perimenopausal and postmenopausal age groups. Twenty-five percent of women with AIDS are over the age of 40. Up to 80% of women who are HIV-positive do not even know that they are infected. Statistics suggest that AIDS in women is not the killer that it is in men, but this difference can

be explained by the way deaths are reported. In women, drug abuse, not AIDS, is listed as the cause of death in 26.5% of women identified as having HIV positivity. Infections not on the list qualifying for a diagnosis of AIDS account for 31.3% of the deaths and thus lead to significant underreporting. In January 1993, the Centers for Disease Control and Prevention (CDC) revised the definition of AIDS to add one condition that is specific to women, invasive cervical cancer. Nevertheless, the magnitude of the problem in women has not been recognized and until recently has not been documented, another example of (perhaps unintentioned) gender disparity.

The second area of gender discrimination in medicine is in the area of the dearth of women in leadership roles in science and medicine. An interesting but little known report on the representation of women in senior-level positions in the federal government has highlighted that the "glass ceiling" is alive and well and further reaching than in just medicine. Entitled "A Question of Equity: Women and the Glass Ceiling in the Federal Government," this report¹⁵ points out that almost as many women as men are employed in white-collar jobs in the federal executive branch but only a small percentage of executive positions are held by women. Only about one out of every four supervisors and one out of every ten executives are women. More important, the report concludes that women confront inequitable barriers, are promoted less often than men at lower levels, and are perceived as less committed than men to their jobs. Career advancement is less available to women than men. Why then should it surprise us that the same has happened to women in medicine?

The scarcity of women in leadership roles in medicine and science has been well documented, although not yet distinguished by a separate report. Three women have finally achieved deanship in U.S. medical schools; however, with 126 available positions, there is no doubt that women are underrepresented. Women are also poorly represented, in both clinical and basic sciences, at the level of full professor. In all clinical departments, only 7.2% of full professors are women. In internal medicine, 5% of full professors are women, and in obstetrics and gynecology, 7.2%. The suggestion that women have only recently begun to enter the field of medicine and that representation at the top will be equivalent when these increased numbers of women rise through the ranks was refuted by a well-publicized study from the Association of American Medical Colleges in which Bickel analyzed what happened to the entering class of 1976.¹⁶ Comparable representation of women

at advanced academic levels was not observed. Although the number of female first-year medical students has increased nearly 425% in the two decades since 1969, these women are not comparably represented at the senior levels of medicine. Overall, women are slightly more likely than men to become medical faculty members, but they do not rise at the rate men do. Of junior full-time faculty first appointed in 1976, 22% of the men had reached the level of full professor by 1991 as compared with 10% of the women.

A report of the Council on Ethical and Judicial Affairs of the American Medical Association (AMA) recognizes the "glass ceiling" phenomenon and discusses some of the obstacles encountered by women.¹⁷ The report lists "exclusion of women from the informal and formal power structures of medicine, inadequate accommodation of pregnancy and family, harmful sexual stereotypes or biases against women, sexual harassment, and a lack of mentorship available to women" as contributing factors and summarizes what data are published as documentation. The disparity in income levels, the hindered access to senior positions in academic institutions, and underrepresentation in medical research are highlighted. Importantly, deleterious effects on the medical profession were recognized to result from the inequalities. Compromised patient care, inadequate research on women's health issues, and an imbalance in priorities were all identified as fallout from an environment of gender disparity and discrimination.

WHAT ARE SOME SOLUTIONS?

Recognition is the first aspect of a solution, and education is the first means of implementation. If solving the problem of the dearth of women in leadership positions in science and medicine will solve the problem of gender discrimination in health care, then the first steps toward recognition have been taken. The second Scientific Advisory Meeting (SAM II) held by the SAWHR focused on leadership issues for women. The concerns of women in academic medicine were explored by representatives from 28 medical specialty societies who provided written testimony on behalf of their organizations as to the problems faced by women in academic medicine and in medical specialty societies. Some societies reported dwindling membership and identified and addressed disincentives to participation. The American College of Physicians reported on recognized barriers that included obstacles to women's career advancement, a perceived lack of concern with personal issues of importance to women, lack of time and institutional sup-

port for research, and lack of opportunity for professional recognition. The American College of Physicians' report concluded that "with few or no women visible on faculty rosters, committees and in leadership positions, the 'old boys' club had a limited appeal."¹⁶

Some societies have developed policies and resources that respond to the special needs of women, the next step of solution through education. Examples of positive initiatives that address family-related concerns include a resolution in 1987 from the American Association of Women Radiologists addressing the "importance of radiology groups having a family leave policy," the publication by the American College of Physicians of a position paper on "Parental Leave for Residents," the development by the American Medical Women's Association (AMWA) of a model day-care manual to outline the steps in building a hospital-based child care center, the inclusion in the directory of approved residency programs by the American Academy of Family Physicians of information on part-time/shared residency programs and child care, and policies established by many societies providing for child care at annual meetings.

In March 1992, the NIH ORWH held a public hearing on "Recruitment, Retention, Re-Entry, and Advancement of Women in Biomedical Careers." Among the mandates of the ORWH is the following: "to increase the participation and advancement of women in biomedical careers." Those presenting testimony were asked to include perceptions of barriers and suggestions for overcoming these obstacles. Recognition of gender discrimination and the development of strategies to eliminate it were identified as crucial to the advancement of women to leadership roles and positions of influence in medicine.

The Council on Ethical and Judicial Affairs report¹⁷ recommended the adoption of certain policy statements in an attempt to decrease and ultimately eliminate gender discrimination in the medical profession; although approached from a clinical, practice, and academic orientation, the recommendations can and should be extended to science and research institutions (as well as the federal government). The Council made a strong recommendation that medical schools take immediate steps to increase the number of women in leadership positions. Inequities in compensation and in tenure decisions should be addressed. An even distribution of teaching, clinical, research, and administrative responsibilities should be ensured. Blinded review of intramural grant proposals, articles for publication, and materials considered by promotion

committees should be instituted. A formal structure for a mentoring process should be developed. Educational programs about gender and cultural issues should be offered to staff to sensitize these workers about harmful stereotypes and biases, to prevent discrimination, and to provide increased insight into human behavior.

Underlying all of these proposed strategies and potential solutions is a theme of education. Most would agree that many of the issues discussed earlier would be eliminated by an educational process addressing gender discrimination and gender disparity. For this reason, vigorous debate has ensued over the pros and cons of establishing a separate women's health specialty.

A WOMEN'S HEALTH SPECIALTY AND/OR CURRICULUM?

The argument that high-quality comprehensive care for women requires the development of a women's health curriculum has received considerable attention. This has led to the proposal that there be a separate women's health specialty. Arguments both for and against this have been presented.

At the University of Illinois conference "The Reframing of Women's Health," the proposal was debated in public. The *Journal of Women's Health* published both sides of this debate, with a discussion and synthesis by Dr. Lila Wallis of AMWA, who has worked to develop a curriculum.¹⁸⁻²¹ At the First Annual Congress on Women's Health held in Washington, D.C., in June 1993, the debate was again presented in a plenary session and a vote taken for a women's health specialty. However along the line, the issues became confused, with curriculum proposals merging with specialty definitions. The common denominator of improved health for women was lost in a battle over turf.

Most would agree that comprehensive woman-centered care is needed. The debate is over how this is to be accomplished. Johnson¹⁸ points out that children have pediatricians and older people have geriatricians but reproductive-age women have only obstetricians and gynecologists who are knowledgeable about women only as reproductive units. Women, she says, do not want to be shuttled from doctor to doctor for comprehensive care. She further emphasizes what has been discussed before, that American medicine is based on a male model of disease; what is taught has been learned from studies done in middle-aged men, from symptoms suffered and manifestations of the disease to its diagnosis and Johnson believes that for the male model to be repudiated for women, for women to be included in clinical studies and have access to health

care, and for women's health to be taken seriously, a specialty in women's health must be established.

The idea of a specialty in women's health is a logical solution, and several models have been developed. A five-phase model based on establishment of the field of women's studies in traditional undergraduate curricula was described by Rosser²². In phase 1, the absence of women was not noted, and the male model was accepted as the norm; in phase 2, women were an add-on, and only the exceptional, the "heroines," were accepted; in phase 3, women were viewed as anomalies or problems and studied for their differences; in phase 4, women became a focus and were studied on their own terms; and in phase 5, gender balance was achieved and both men and women functioned as equals. In terms of establishment of a women's health specialty as a separate discipline, phase 3, where women are recognized as different, was reached in the recent past; we are now in phase 4, where both the women's health initiative and the debate over a separate specialty are examples of women as a focus. Women's studies underwent an evolution over two decades or more, and this field is now totally accepted. The goal of a gender-balanced medical curriculum and gender-equivalent health care has not been met, and whether this goal requires establishing a specialty is the debate. Rosser's model does not take into consideration the complexities of American medicine, where the emphasis is not on education but realistically on economics.

Deciding the need for a separate specialty polarizes existing specialties and engenders turf battles. Arguments against women's health as a specialty are many, and resistance is remarkably high, particularly among health professionals. Proposed change produces anxiety, but Johnson¹⁹ states that the resistance encountered has been out of proportion; her analysis is that "the anxiety is fueled by forces as divergent as sexism, economics, and alliances to existing specialties." Obstetrician-gynecologists, internists, and family practitioners are not in favor of establishing a women's health specialty. The economic questions are the real ones. Costly fragmentation, dilution of health care, and overspecialization are arguments that make sense. The ghettoization of women's health care is a possibility to be avoided.

Harrison²³ thinks that the debate is going in the wrong direction and that there are two issues to be considered, one of improved clinical care of women and the other of how to create and institutionalize a body of knowledge about women's health. Harrison suggests that the reframing of women's health requires a new question, "what model of women's health best meets the needs of

women as patients?" Primary care for women should be based on wellness and preventive health, with attention to their psychosocial roles. Specialties could be restructured, neither eliminated nor replaced by a new specialty. Women's access to health care, education, and services could be expanded through new technologies and more emphasis placed on the role of women as active, not passive, consumers in the health care field. Harrison recommends exploring interdisciplinary links and working to improve the system rather than establishing a new one. The practice of women's health would encompass a unique body of knowledge and require skills based upon experience that would cross the boundaries of existing specialties. Would retraining of primary care physicians suffice?

Curriculum reform is a daunting prospect, but this may be the most attainable proposal. There is general recognition that "women's health" is not part of the medical curriculum. Studies show that more is taught about women's health in nursing than in dental, osteopathic, or medical schools, almost none in our residencies, and little in continuing medical education courses, although this aspect is changing. Wallis²⁴ concludes that when the health needs of women are critically examined, the development of an advanced curriculum on women's health is a feasible, cost-effective, efficient, cooperative, immediate solution to eliminating many of the problems of fragmentation, gender bias, and cost discussed earlier. Such a curriculum would be designed to build on existing knowledge and teach the differences between men and women in terms of physiology, pathology, pharmacology, and psychology. The AMWA began to draft the first core curriculum in 1990 and held part I in late 1993 in the form of a 3-day continuing medical education course aimed at primary care physicians. Other courses are being developed and advertised since women's health is seen as a high-interest area. This leads to an important issue, that of accountability and credibility. Who will be the responsible body for accreditation if there is no recognized specialty?

The future, then, might lead to the establishment of a new multidisciplinary specialty, or it might lead simply to curriculum reform. As Harrison has suggested, the best model for improving health care for women must be sought; we do not yet know what that is.

PREDICTIONS FOR THE FUTURE

The future for women's health care must stress conceptual and systemic change in both medical practice and research. A woman-

centered approach with acknowledgment of women's diversity must be infiltrated throughout the health care system such that gender differences can be identified and gender disparity eliminated. Both the health care and the research agenda must be responsive to community needs, with linkages developed among consumers, providers, and researchers. The concept of women's health as wellness and involving health promotion and disease prevention as well as aggressive diagnosis and treatment must be adopted, and the interdisciplinary aspect involving the biomedical, psychosocial, behavioral, and health research communities must be promoted. All health care providers must be used to improve health care for women, with retraining, advanced curricula, and restructuring of responsibilities. Finally, there must be access to health care services and insurance reform to allow entry into the system.

An ongoing dialogue about women's health issues calling for a major re-envisioning of women's health research and women's health care provision is essential now and in the future. Our population is aging, and the majority of that aging population will be women; medical education will have to deal more with chronic diseases and chronic care and with strategies to improve the quality of life of women. Geriatrics, nutrition, health economics, prevention, health promotion, and even ethics will have higher priorities in medical education and patient care. The medical curriculum of the future will reflect these changes in medical practice.

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Management of Alzheimer's Disease

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Although there is no cure for Alzheimer's disease (AD) and the disorder can be neither prevented nor arrested, there are a range of treatment and management options for the patients with AD and their families. There is a growing state of the art of pharmacologic, behavioral, and psychosocial approaches that the clinician can apply or coordinate.¹⁻⁴ Interventions are available that can alleviate the patient's symptoms and suffering, coping skills can be enhanced at different points in time along the course of the disorder, and the dignity with which one lives through the progression of AD can be maintained. Meanwhile, clinical interventions are available to help mitigate the high level of family stress and reactive depression that can accompany AD, thereby influencing the quality of life for the family as a whole. Several

TABLE 1.

Concepts Influencing the Treatment and Management of Patients With Alzheimer's Disease

Establishing the correct diagnosis—making sure that it is Alzheimer's disease
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FEMALE MILITARY VETERANS AND TRAUMATIC STRESS

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Despite increasing interest in women in the military, the literature on female veterans and traumatic stress is surprisingly limited. This situation appears partly due to a lack of female veterans' public visibility and a corresponding failure to emphasize the scientific study of women in general. As a result of that climate, the earliest writings on female veterans and traumatic stress are largely personal recollections or clinical descriptions, typically by women who served in Vietnam. Today, as the scientific study of life trauma accelerates, investigators are increasingly conducting more empirical studies of traumatic stress in female veterans and examining in greater detail the spectrum of military stressors that may put women at risk for problems in readjustment. This article reviews a number of the important papers on female veterans and traumatic stress. As with any newly emerging scientific field, some of the important writings on this topic are found in books and unpublished dissertations (e.g., Salvatore). The review concludes by suggesting some areas for future research.

Schnaier's (1986) dissertation was one of the earliest and most comprehensive examinations of women and war stress. Using 89 female Vietnam theater veterans, Schnaier administered an extensive questionnaire containing scales on exposure, symptomatology, and readjustment. Although formal diagnoses of PTSD were not made, the study showed that as many as 50% of participants experienced symptoms suggestive of PTSD, with at least 20% of the respondents feeling that symptoms were significantly disruptive. This study represented one of the first efforts to systematically identify and delineate traumatic war stressors in women, evaluating, for example, the experiences and effects of activities such as handling deaths and mutilations. Shortly after, Paul (1985) developed a questionnaire to investigate female veterans' distinctive wartime stressors and was able to identify a series of both event (i.e., war-zone) and personal (i.e., demographic) characteristics that, at least on a descriptive basis, were associated with poorer postwar adjustment in women Vietnam veterans, including military service at a younger age, less military and professional experience, and occupational trauma (e.g., extensive exposure to death and dying). These factors were later confirmed by Baker et al. (1989). Like the preceding studies, Norman's (1988) inter-

views of 50 American nurses who served in Vietnam focused on the examination of outcome, stressor characteristics, and individual factors, notably the intensity of wartime stressors for noncombatants and the negative effect of limited postwar supports on subsequent adjustment. As with men, these experiences were related to the continuation of higher levels of intrusive and avoidant stress symptoms, although overall rates of symptomatology declined over time.

The National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990) was the first randomized, carefully controlled study to investigate the prevalence of PTSD and associated disorders in female theater veterans. This study had the benefit of specially designed psychometric instruments (e.g., the Mississippi Scale for Combat-Related PTSD) to corroborate interview data reflecting the presence of stress symptoms. When this study was completed, it essentially confirmed and extended prior descriptive studies on traumatic stress in female veterans, showing that although female Vietnam theater veterans had lower rates of PTSD than male combatants, women clearly suffered from the disorder in relation to the level of war-zone exposure. Furey (1991) reviews this and the preceding studies, and discusses some issues related to PTSD assessment in female veterans.

Another source relates more directly to treatment considerations, including the effect of women's minority status within the military. Brende & Parson (1985) provide a discussion of the clinical implications of both female veterans' stressors and the adverse impact of minority status. Also included is a theoretical discussion of the differential effects of high- and low-magnitude stressors and the role of personal meaning and attribution in mediating women's adjustment to war stress. A number of treatment suggestions are made for dealing with issues of uniqueness, caretaking, and secrecy. Rothblum and Cole (1986) have edited an unusual compendium of writings by authors from a variety

Dr. Wolfe is the Acting Director of the Women's Health Sciences Division of the National Center for PTSD at the Boston VAMC. This Division has pioneered research on the psychological impact of military service on female veterans. Such initiatives include development of psychological and psychophysiological assessment techniques, large-scale surveys of female Vietnam veterans, and Operation Desert Storm returnees. There has been a special emphasis on the impact of sexual assault and on the effect of PTSD on women's physical health.



of mental health orientations. The collection contains analyses on the traumatic exposure and painful psychological recovery of a female Vietnam theater veteran. A primary utility is their presentation of the need for a variety of treatment conceptualizations and approaches in dealing with traumatic stress in women. The importance of clinicians' appreciation for the impact of social mores on women's expression of traumatic experiences and the propensity for silence and maintenance of caretaking roles is also emphasized. The paper by Resick (1986) in this collection clearly describes the theory and practice of cognitive behavioral treatment of PTSD.

More recent empirical studies have focused on topics such as vocational readjustment, symptom expression (including suppression and intensification), and coping. In a distinctive study of the effects of women's active duty status on stress symptomatology, Stretch et al. (1985) showed that, despite clear-cut exposure, female active duty personnel had significantly less PTSD than their discharged veteran cohorts, suggesting that social support functioned as a substantial moderator of initial PTSD. Leon et al. (1990) studied coping patterns in female Vietnam and Vietnam-era veterans and found that despite greater psychological and interpersonal problems in the Vietnam theater women, coping that entailed more self-blame and a focus on negative affect and cognitions was significantly associated with poorer outcome, irrespective of war-time status. Besides providing the first empirical study of the process of coping and its effects in female veterans, the study offers preliminary data on the existence of military stressors among *era* females, a topic sometimes overlooked in the delineation of war trauma. In the first article on homeless female veterans, Leda et al. (1992) describe a small (1.6%) but noteworthy female subset of the current homeless veteran population. These women are likely to be younger, have lower rates of employment, and suffer from more serious mental illness (particularly mood disorders) than comparable males. Although rates of PTSD were not substantial, more comprehensive evaluation of diagnostic status is indicated. Finally, commensurate with the PTSD literature in male veterans, studies of female veterans now suggest a vulnerability for symptom intensification in women with prior wartime exposure. Wolfe et al. (1992) used PTSD-validated psychometric tests to examine the reactions of female Vietnam veterans to the onset of the Persian Gulf War. The authors found that many of these veterans experienced clinically significant intensification of stress symptoms following the start of the war, with the greatest symptom increases seen in individuals with previously documented PTSD.

Systematic studies of women's military and wartime exposure (rather than stress reactions) are still lacking. Dienstfrey (1988) offers a broad-based review of combat and war-zone exposure in female veterans across all eras, with the interesting finding that when traditional exposure parameters are used, World War II female veterans demonstrate the highest rates of combat exposure. A more recent paper by Wolfe et al. (in press) presents the psycho-

metric properties of a war-zone stressor scale for women, which was able to identify empirically a variety of significant stressors ranging from hazardous occupational tasks to sexual assault.

All of these studies demonstrate the importance of continuing further research into traumatic stress in female veterans. Given the rates of victimization in our society, future studies will certainly need to consider the network of events encountered by female veterans and their potential additive or interactive effect across the life span.

SELECTED ABSTRACTS

BAKER, R.R., MENARD, S.W. & JOHNS, L.A. (1989). The military nurse experience in Vietnam: Stress and impact. *Journal of Clinical Psychology*, 45, 736-744. Demographic, health, and psychosocial data from two studies are presented on military nurses assigned to Vietnam. Army nurse subjects in the first study were grouped for comparison on three major variables: assignment to Vietnam before versus after the 1968 Tet Offensive, type of nursing duties performed, and years of experience as a registered nurse (RN) prior to assignment in Vietnam. The second study compared another group of Army nurses with a group of Air Force and Navy nurses also assigned to Vietnam. Army nurses with less than two years RN experience prior to their assignment were found to be more at risk for such negative outcomes as difficulty establishing personal relationships and difficulty coping with stressful situations. Stress experiences, career dissatisfaction data, and health problems of military nurses and their children are reported. Also described are positive experiences of nurses in developing personal relationships in a rewarding professional environment.

BRENDE, J.O. & PARSON, E.R. (1985). Special veteran groups: Women and the ethnic minorities. In J.O. Brende & E.R. Parson (Eds.), *Vietnam veterans: The road to recovery* (pp. 125-165). New York: Plenum Press. Women and the ethnic minorities represent special populations of Americans who served in Southeast Asia during the Vietnam era. We refer to these groups as "special" because of the uniqueness of their readjustment needs, which have significant gender role and cultural elements. This uniqueness is based, essentially, on their marginal status in American society. Both female and ethnic minority veterans have had experiences in the military that differ in fundamental, qualitative ways from those of white male veterans.

DIENSTFREY, S.J. (1988). Women veterans' exposure to combat. *Armed Forces and Society*, 14, 549-558. Women veterans who were exposed to combat during their service were primarily Army nurses who served during World War II. Additional information presented is consistent with this conclusion. For example, those who were exposed to combat have a higher rate of postsecondary education and are more likely to be officers. Rates of combat exposure increase with age for each wartime period of service. The history of minority women in the military, and the career choices available to them prior to and during World War II, explains their relatively low rate of combat exposure. Like men, more women were exposed to combat in World War II than during either the Korean conflict or the Vietnam era. Other characteristics of women combat veterans — particularly higher postsecondary education, increased age, and a lower proportion of minority participants than noncombat-exposed female counterparts — stand in diametric contrast to what is perceived about men who have been exposed to combat.

FUREY, J.A. (1991). Women Vietnam veterans: A comparison of studies. *Journal of Psychosocial Nursing and Mental Health Services*, 29, 11-13. There is strong evidence that many women exposed to war stress have suffered mental health problems related to their experience, and a substantial number continue to have serious emotional, psychosocial, and other readjustment problems that affect their current level of functioning and life satisfaction. The consistent exposure to severe combat casualties, death and dying, workload extremes, personal deprivation, loss, and danger all take a significant emotional toll. These studies underscore the need for affected women to explore their war experiences and associated feelings with mental health professionals, as well as the need for those professionals to develop an awareness and understanding of the impact of specific war-related stress on women.

KULKA, R.A., SCHLENGER, W.E., FAIRBANK, J.A., HOUGH, R.L., JORDAN, B.K., MARMAR, C.R. & WEISS, D.S. (1990). Trauma and the Vietnam War Generation: Report of findings from the National Vietnam Veterans Readjustment Study. New York: Brunner/Mazel. Abstracted in *PTSD Research Quarterly*, 1(3), 1990.

LEDA, C., ROSENHECK, R. & GALLUP, P. (1992). Mental illness among homeless female veterans. *Hospital and Community Psychiatry*, 43, 1026-1028. This study examined sociodemographic and psychiatric diagnostic data from 19,313 veterans seen in the Department of Veterans Affairs Homeless Chronically Mental Ill (HCMI) Veterans Program from 1988 to 1991. It does not appear that women are disproportionately represented in the HCMI veterans program. Compared with the male group, a significantly larger proportion of homeless female veterans were diagnosed as having major psychiatric disorders, and a significantly smaller proportion had substance use diagnoses. The homeless women in our study appeared to be diagnostically similar to homeless female nonveterans. [Adapted from Text]

LEON, G.R., BEN-PORATH, Y.S. & HJEMBOE, S. (1990). Coping patterns and current functioning in a group of Vietnam and Vietnam-era nurses. *Journal of Social and Clinical Psychology*, 9, 334-353. A group of 36 nurses who served in Vietnam were compared with a group of 32 Vietnam-era military nurses on patterns of coping during their duty tours, the impact of their experiences, and current functioning. Coping patterns related to expressing feelings, seeking emotional support, and searching for meaning in the events experienced were associated with good present psychological functioning. The use of self-blame, withdrawal, and anxious thoughts as means of coping was related to current psychological dysfunction. There was a trend for a greater proportion of the Vietnam group to report continuing emotional and relationship problems later than one year after Vietnam service.

NORMAN, E.M. (1988). Post-traumatic stress disorder in military nurses who served in Vietnam during the war years 1965-1973. *Military Medicine*, 153, 238-242. Fifty nurses who served in Vietnam in the military were interviewed about their war experiences and the presence of PTSD. Results indicate that the number of nurses suffering from this disorder has decreased since the initial postwar years. Two variables, the intensity of the wartime experience and supportive social networks after the war, influenced the level of PTSD.

PAUL, E.A. (1985). Wounded healers: A summary of the Vietnam Nurse Veteran Project. *Military Medicine*, 150, 571-576. The Vietnam Nurse Veteran Project was designed to identify stressors

and after-effects experienced by nurses from the psychosocial milieu peculiar to the Vietnam War. The sample included 137 nurse veterans who completed a 52-item questionnaire designed by the author and a co-investigator. Content analysis of the data identified eight specific stressors in the nurses' environment in Vietnam, such as the young age and severity of the casualties, danger to the nurses' lives, sexual harassment, and survival guilt. Fourteen adverse after-effects were identified and affected more than one-third (39%) of the respondents. Some of the after-effects included nightmares, flashbacks, career problems, and physical or emotional problems. This study reveals that nurses, like combat veterans, have suffered adverse after-effects from the Vietnam War, although the stressors of the war, for the nurses, were markedly different.

RESICK, P.A. (1986). Post-traumatic stress disorder in a Vietnam nurse: Behavioral analysis of a case study. In E.D. Rothblum & E. Cole (Eds.), *A woman's recovery from the trauma of war: Twelve responses from feminist therapists and activists* (pp. 55-65). New York: Haworth Press. (See below).

ROTHBLUM, E.D. & COLE, E. (Eds.) (1986). *A woman's recovery from the trauma of war: Twelve responses from feminist therapists and activists*. New York: Haworth Press (also published as *Women & Therapy*, 5(1), Spring 1986). Contains twelve discussions of the case of "Ruth," a 39-year-old woman who served as a Navy nurse in Vietnam and was referred to a psychologist in private practice by a Veterans Administration Alcoholism Treatment Program. [Adapted from Text]

SALVATORE, M. (1992). Women after war: Vietnam experiences and posttraumatic stress: Contributions to social adjustment problems of Red Cross workers and military nurses. Unpublished doctoral dissertation, Simmons College School of Social Work, Boston. This study described the unique experiences and reactions of Red Cross workers and military nurses, exploring in particular the relationships between Vietnam experiences and PTSD symptoms and PTSD symptoms and later adjustment problems. The sample (n = 335) of 233 Red Cross workers and 102 military nurses responded to a mailed questionnaire. Measures for Vietnam experiences, PTSD symptoms, and demographic data were developed for this study. The CES-D scale for depressive symptoms and the Social Adjustment Scale were also utilized. Both groups suffered PTSD symptoms with nurses showing more short-term effects and more frequent nightmares and alcohol problems. In 1987 a third of the group reported depressive symptoms, PTSD symptoms, and vulnerability to social adjustment problems. PTSD symptoms contributed to social adjustment difficulties with mates, children, families, friends and work. [Abridged Abstract]

SCHNAIER, J.A. (1986). A study of women Vietnam veterans and their mental health adjustment. In C.R. Figley (Ed.), *Trauma and its wake. Vol. II: Traumatic stress theory, research, and intervention* (pp. 97-132). New York: Brunner/Mazel. Using a modified version of Wilson and Krauss's (1981) Vietnam-Era Stress Inventory, Schnaier studied 86 women veterans (primarily nurses attached to medical facilities located in Vietnam) to assess the nature and extent of the mental health problems affecting female veterans and if their traumatic stressors were similar to male veterans experiencing symptoms of PTSD. The author reported a significant correlation between the stressors identified and symptoms associated with PTSD. The research revealed, among other things, evidence of current mental health distress among female veterans; personal and professional growth associated with war ser-

vice; and significant differences with regard to biographic/demographic factors between male and female veterans. According to Schnaier, this latter finding emphasizes the need for further investigation of the female veteran population. She concludes the chapter with a discussion of the implications of the findings for treating women Vietnam veterans.

STRETCH, R.H., VAIL, J.D. & MALONEY, J.P. (1985). Post-traumatic stress disorder among Army Nurse Corps Vietnam veterans. *Journal of Consulting and Clinical Psychology*, 53, 704-708. Results are presented from an epidemiologic investigation of PTSD among Army nurse veterans [Vietnam Era Nurses Adjustment Survey]. Analysis of questionnaire data from more than 700 Vietnam and Vietnam-era veterans still on active duty in the U.S. Army Nurse Corps reveals a current PTSD rate for Vietnam veteran nurses of 3.3%. This rate is comparable to that found among non-nurse active-duty Army Vietnam veterans (5.1%) and is much lower than estimates (18%-54%) for civilian Vietnam veterans. Results suggest that danger and exposure to violence may be responsible for stress reactions such as PTSD among noncombatants. Additional results indicate that social support is an important moderator in the attenuation of PTSD.

WOLFE, J., BROWN, P.J. & BUCSELA, M.L. (1992). Symptom responses of female Vietnam veterans to Operation Desert Storm. *American Journal of Psychiatry*, 149, 676-679. **Objective:** This study examined the status of symptoms of PTSD in a cohort of women after the onset of Operation Desert Storm. **Method:** Seventy-six non-treatment-seeking Vietnam veterans were obtained from lists of those who recently had participated in other research projects conducted at the National Center for Post-Traumatic Stress Disorder. Before the onset of Operation Desert Storm, subjects had completed a set of psychometrically valid instruments measuring general psychological symptoms and PTSD symptoms (e.g., SCL-90-R, Mississippi Scale for Combat-Related Posttraumatic Stress Disorder). On the basis of the latter scale, subjects were divided into groups with and without PTSD symptoms. At the height of the military conflict, subjects were recontacted and asked to complete the SCL-90-R and the Veterans Update Form, a measure assessing changes in PTSD symptoms. **Results:** Multivariate analyses indicated that while most female Vietnam veterans experienced some intensification of stress-related symptoms during Operation Desert Storm, those who had previously reported high levels of PTSD were significantly more susceptible to greater distress. **Conclusions:** Results of this survey indicate that female Vietnam veterans with prior wartime exposure are an at-risk population for the intensification of stress symptoms after the recurrence of a military conflict.

WOLFE, J., BROWN, P.J., FUREY, J. & LEVIN, K.B. (in press). Development of a War-Time Stressor Scale for Women. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*. Prior research has demonstrated the importance of stressor measurement as a component of evaluating PTSD. Much of the work conducted in this area has focused on male combat veterans, resulting in the development of several combat exposure scales. The nature of war-zone exposure for women, however, has not been systematically addressed. This paper describes the development and preliminary psychometric analyses of the Women's War-Time Stressor Scale (WWSS) - an instrument designed to measure the self-report of wartime stressors by both theater and era veterans as well as civilian women who served in Vietnam. Measurement of internal consistency, test-retest reliability, and construct validity points to the potential clinical and research utility of this type of instrument.

SLEEP DISTURBANCE IN POST-TRAUMATIC STRESS DISORDER

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This section of the *PTSD Research Quarterly* is devoted to the symptom most commonly reported by survivors of trauma, sleep disturbance. Notwithstanding the prominence of nightmares and impaired sleep initiation/maintenance in PTSD, the literature addressing them is small, major currents have yet to coalesce, and instances where one study has built upon another are rare. The study of sleep disturbance in PTSD is embedded, however, in an active network of disciplines concerned with such diverse topics as chronobiology, brainstem modulation of behavioral state, and cognitive treatment of nightmares. The following bibliography reflects some of this diversity.

Nightmares. Preeminent among topics within the field of sleep in PTSD is that of nightmares. A question of particular concern to researchers is whether PTSD-related nightmares arise out of REM sleep, NREM sleep, or both (Ross et al., 1989). Since baseline physiological parameters, and especially their dynamics, vary considerably across sleep states, preferential emergence of PTSD nightmares from one or the other could be informative. Contributing to continued uncertainty in this regard, however, is the intriguing fact that nightmares occur only rarely in the sleep laboratory (Hartmann, 1984). Nevertheless, sketchy direct and indirect data bearing on this question can be found (Kramer et al., 1984; Lavie et al., 1979; Ross et al., 1990; van der Kolk et al., 1984; Woodward et al., 1991a,b).

A closely related (some would say, equivalent) question is whether PTSD nightmares more closely resemble episodes of dream anxiety (definitionally REM-based), or night terrors (also termed *pavor nocturnus*, a slow wave sleep phenomenon observed principally in children). Fisher et al. (1970) have provided vivid descriptions of adult night terror and REM nightmare episodes with accompanying psychophysiology in normals. Also pertinent is the distinction between acquired PTSD nightmare disturbance and "lifelong" dream anxiety (see van der Kolk et al., 1984). Continuities have been examined between PTSD nightmares and nocturnal panic attacks (Hauri et al., 1989; see also Mellman & Uhde, 1989a,b) and REM behavior disorder (Ross et al., 1990). Finally, Kammer and Lavie (1991) have reported dramatically reduced dream recall associated with successful post-trauma adjustment in a sample of Holocaust survivors.

Beyond Nightmares. To date, sleep researchers in PTSD have focused on features of sleep architecture that have dominated the existing literature on sleep and psychopathology, REM latency, and slow wave sleep. Regarding both, the PTSD sleep literature is self-contradictory. The latency of REM sleep in PTSD has been reported to be both reduced (Greenberg et al., 1972; Kauffman et al., 1987) and increased (Glaubman et al., 1990; Hefez et al., 1987; Lavie et al., 1979). Slow wave sleep has been reported to be reduced (Glaubman et al., 1990; Kramer et al., 1984), in-

creased (Dagan et al., 1991), and normal (Hefez et al., 1987; Lavie et al., 1979). Interestingly, both cholinergic (Hobson & Steriade, 1986) and noradrenergic (Siegel & Rogawski, 1988) perspectives on REM sleep would seem to converge on a prediction that REM "pressure" would be increased and REM latency reduced in PTSD.

Other currents in basic sleep research may prove important to the study of sleep in PTSD. One such area is the study of cognitive activity during sleep. Normals can respond to auditory stimuli from all stages of sleep with little modification of sleep architecture. Frequent anecdotal reports from combat-related PTSD patients suggest continuous heightened awareness of the sleeping environment and hair-trigger arousability. Interestingly, there is evidence that combat veterans with PTSD have *elevated* arousal thresholds under certain conditions (Dagan et al., 1991; Schoen et al., 1984).

Treatment Studies. Though there is empirical support for the common notion that sleep loss results in performance failures, and reason to suspect that motor vehicle accidents have caused a disproportionate number of deaths in Vietnam combat veterans (Centers for Disease Control, 1987), causative links have yet to be established between sleep disturbance and accidents, medical disease, and/or dysfunction in PTSD patients. Nevertheless, patients' dysphoria associated with sleep complaints (Inman et al., 1990) has motivated efforts to treat sleep loss in this group. The small literature concerned with the treatment of sleep disturbances in PTSD has focused almost exclusively upon the reduction of traumatic nightmare frequency, and consists largely of single-case studies employing systematic desensitization or imaginal flooding. The study of Cooper and Clum (1989) represents a significant methodological advance in this area. Controlled studies of therapeutic agents for PTSD sleep disturbance have yet to be performed. Nevertheless, the reader may be interested in two brief multiple-case reports using imipramine (Marshall, 1975) and cyproheptadine (Brophy, 1991).

In conclusion, research on sleep disturbance in PTSD stands to benefit from the addition of new methods, larger well-defined subject groups, and liberal exploration of domains outside the current mainstream of sleep in psychopathology.

SELECTED ABSTRACTS

BROPHY, M.H. (1991). Cyproheptadine for combat nightmares in post-traumatic stress disorder and dream anxiety disorder. *Military Medicine*, 156, 100-101. Pharmacologic treatment of patients with PTSD often involves antidepressant drugs. Combat nightmares often persist. The addition of cyproheptadine, in a median dose of 16-24 mg orally at night, controls the nightmares.

COOPER, N.A. & CLUM, G.A. (1989). Imaginal flooding as a supplementary treatment for PTSD in combat veterans: A controlled study. *Behavior Therapy*, 20, 381-391. The present study examined the incremental effectiveness of imaginal flooding (IF)

over standard psychotherapeutic and pharmacologic approaches in the treatment of combat-related PTSD. Evidence was found supportive of IF's effectiveness with regard to self-report symptoms directly related to the traumatic event(s), state anxiety, subjective anxiety in response to traumatic stimuli, and sleep disturbance. Flooding had no effect on level of depression or trait anxiety, indicating that it is a useful adjunctive treatment for PTSD but cannot likely be used as the sole vehicle of change.

DAGAN, Y., LAVIE, P. & BLEICH, A. (1991). Elevated awakening thresholds in sleep stage 3-4 in war-related post-traumatic stress disorder. *Biological Psychiatry*, 30, 618-622. Awakening thresholds from sleep stage 3/4 were investigated in 19 DSM-III-defined, war-related PTSD patients compared with 6 normal controls. Patients had significantly higher awakening thresholds and significantly longer latencies to an arousal response than controls. These results are interpreted to suggest modifications in the depth of sleep as one of the long-term sequelae of traumatic events.

GLAUBMAN, H., MIKULINCER, M., PORAT, A., WASSERMAN, O. & BIRGER, M. (1990). Sleep of chronic post-traumatic patients. *Journal of Traumatic Stress*, 3, 255-263. The purpose of the present study was to investigate the sleep of people diagnosed as suffering from chronic PTSD. The sleep of seven chronic post-traumatic patients with no known physical injuries was compared with that of seven matched control subjects. The post-traumatic patients had poorer sleep: decreased sleep efficiency, increase in number of awakenings, and decreased slow wave sleep, as well as longer REM latency. It was also found that their complaints correlated with relevant sleep-monitored measures.

GREENBERG, R., PEARLMAN, C.A. & GAMPEL, D. (1972). War neuroses and the adaptive function of REM sleep. *British Journal of Medical Psychology*, 45, 27-33. This study deals with the relationship between the psychological state of a number of patients with war neuroses and the development of REM sleep. Beginning with the hypothesis that REM sleep is involved in the process of handling and integrating stressful experiences, we developed a method of assessing a patient's psychological state at the time of the sleep study in order to correlate psychological state with sleep recordings. Using our approach, we have been able to demonstrate a clear relationship between specific psychodynamic events in a patient and the physiological concomitants of dreaming, most striking in relation to pressure to dream as measured by REM latency. [Adapted from Text]

HEFEZ, A., METZ, L. & LAVIE, P. (1987). Long-term effects of extreme situational stress on sleep and dreaming. *American Journal of Psychiatry*, 144, 344-347. Sleep data were obtained on 11 patients who had survived traumatic events and who complained of sleep disturbances. Each was awakened from REM and non-REM sleep for dream recall. The patients had lower sleep efficiency indices (because of prolonged sleep latency and larger amounts of "awake" plus "movement" time within sleep periods), shorter REM time, and longer REM latencies than did control subjects. Four of the 11 patients had REM- and non-REM-related nightmares, which, in two sea disaster patients, were associated with REM-related motor activity. The rest of the patients had unusually low dream recall in spite of high eye movement density.

INMAN, D.J., SILVER, S.M. & DOGHRAMJI, K. (1990). Sleep disturbance in post-traumatic stress disorder: A comparison

with non-PTSD insomnia. *Journal of Traumatic Stress*, 3, 429-437. Sleep disturbances, including repetitive nightmares and insomnia, are central and long-lasting aspects of PTSD. This study utilized a questionnaire to compare sleep disturbance in Vietnam war combat veterans having PTSD with non-PTSD patients having insomnia without other PTSD symptoms. The PTSD group reported symptoms of anxiety, agitation, and concurrent body movement, which were associated with insomnia. Nightmares of this group were more repetitive and more disruptive of a return to sleep than the non-PTSD insomnia group. The PTSD group also reported more fatigue during daytime functioning and more anxiety during waking hours than the non-PTSD insomnia group.

KAMINER, H. & LAVIE, P. (1991). Sleep and dreaming in Holocaust survivors: Dramatic decrease in dream recall in well-adjusted survivors. *Journal of Nervous and Mental Disease*, 179, 664-669. Sleep data were obtained on 12 well-adjusted and 11 less-adjusted Holocaust survivors and on 10 control subjects. Each was also awakened from rapid eye movement sleep for dream recall. The less-adjusted survivors had more prolonged sleep latency than the well-adjusted and the control groups and lower sleep efficiency than the control subjects. The well-adjusted group had a significantly lower dream recall rate (33.7 percent) than the less-adjusted (50.5 percent) and control groups (80 percent). There were also significant between-groups differences in dream structure and dream content, in the direction of less complex and less salient dreams in the well-adjusted survivors. It is suggested that the decrease in dream recall is one of the forms of long-term adjustment to severe traumatic events.

KAUFFMAN, C.D., REIST, C., DJENDEREDJIAN, A., NELSON, J.N. & HAJER, R.J. (1987). Biological markers of affective disorders and post-traumatic stress disorder: A pilot study with desipramine. *Journal of Clinical Psychiatry*, 48, 366-367. Three biological markers of affective disorders and response to desipramine were used to study the relationship of PTSD to affective illness. Blunted TRH response and decreased REM latency in eight patients with PTSD occurred at frequencies similar to those that have been found in patients with major affective disorder. Pretreatment Hamilton Rating Scale for Depression and Beck Depression Inventory scale scores were elevated; scores after 4 weeks' treatment with desipramine revealed significant ($p < .05$ and $p < .005$, respectively) improvement. These findings support a link between PTSD and affective illness.

KRAMER, M., SCHOEN, L.S. & KINNEY, L. (1984). The dream experience in dream-disturbed Vietnam veterans. In B.A. van der Kolk (Ed.), *Post-traumatic stress disorder: Psychobiological and biological sequelae* (pp. 81-95). Washington, D.C.: American Psychiatric Press. Compared Vietnam combat veterans with and without nightmare complaints. Those without nightmares had to endorse at least one other symptom of PTSD. Reduced REM percent (18%) was observed in both groups. Content of mentation was obtained from experimenter-initiated awakenings from REM and NREM sleep. Nightmare sufferers included Vietnam-related content in 47% of dream reports, while the comparable figure for controls was only 4%. Within nightmare sufferers, Vietnam-related content was not preferentially associated with REM vs. NREM awakenings. [SHW]

LAVIE, P., HEFEZ, A., HALPERIN, G. & ENOCH, D. (1979). Long-term effects of traumatic war-related events on sleep. *American Journal of Psychiatry*, 136, 175-178. 11 patients who had combat neuroses resulting from the 1973 Yom Kippur War and

complained of sleep disturbances were studied in a sleep laboratory. Sleep-onset insomniacs, dream-interruption insomniacs, and pseudoinsomniacs were differentiated on the basis of electrophysiologic recordings. Compared with normal controls who actively participated in the Yom Kippur War, patients showed significantly longer sleep latencies, lower sleep efficiency indices, lower percentage of REM sleep, and longer REM latencies.

MARSHALL, J.R. (1975). The treatment of night terrors associated with the posttraumatic syndrome. *American Journal of Psychiatry*, 132, 293-295. The author describes three cases in which the frequency and intensity of night terrors associated with the posttraumatic syndrome were greatly lessened by administration of imipramine; in one case, the night terrors disappeared completely. Possible explanations for this effect of imipramine are discussed, including the drug's arousal-preventing action. The author believes that the study of sleep EEGs of patients suffering posttraumatic syndrome will prove fruitful.

ROSS, R.J., BALL, W.A., DINGES, D.F., MULVANEY, F.D., KRIBBS, N.R., MORRISON, A.R. & SILVER, S.M. (1990). Motor activation during REM sleep in posttraumatic stress disorder. *Sleep Research*, 19, 175. While most studies find excessive movement in the sleep of PTSD patients, especially during nightmares, REM sleep is normally associated with atonia. These investigators performed polysomnography, with special emphasis on recording and quantification of leg EMG, on 11 PTSD patients and 6 controls. The authors found that in PTSD patients 4.6% of REM epochs included phasic EMG, while for controls, this figure was only 1.3% ($p < 0.05$). NREM periodic leg movements were also more frequent in the PTSD patients (11 per hour vs. 1 per hour, $p < 0.01$). These findings were consistent with a generalized motor dyscontrol syndrome. Its association with REM sleep, or even sleep *per se*, remained equivocal. The authors went on to note, however, that the presence of periodic leg movements, in particular, distinguished the PTSD patients from depressed patients, in whom such movements have generally not been observed. [SHW]

ROSS, R.J., BALL, W.A., SULLIVAN, K.A. & CAROFF, S.N. (1989). Sleep disturbance as the hallmark of posttraumatic stress disorder. *American Journal of Psychiatry*, 146, 697-707. Cited in *PTSD Research Quarterly*, 1(1), 1990.

SCHOEN, L., KRAMER, M. & KINNEY, L. (1984). Auditory thresholds in the dream disturbed. *Sleep Research*, 13, 102. Studied 16 Vietnam combat veterans: 8 qualified as "dream disturbed" by demonstrating lab nightmares ($\Delta\text{REM} \geq \text{REM}$); 8 qualified as controls by reporting no nightmare complaints. The dream disturbed veterans were more responsive than controls to supra-threshold stimuli during sleep. This finding held for respiration and gross motor responses, not heart rate or chin EMG, and reached significance only during NREM sleep. As in other arousal studies thresholds were generally lower in REM and generally lower later in the night; however, in apparent contradiction to this finding, the dream disturbed veterans demonstrated significantly elevated thresholds to arousal stimuli in an ascending limits protocol. This held for both REM and NREM sleep but seemed especially prominent in early REM. [SHW]

VAN DER KOLK, B.A., BLITZ, R., BURR, W.A., SHERRY, S. & HARTMANN, E. (1984). Nightmares and trauma: A comparison of nightmares after combat with lifelong nightmares in veterans. *American Journal of Psychiatry*, 141, 187-190. In this study the

chronic traumatic nightmares of men who had been in combat were found to differ from the lifelong nightmares of veterans with no combat experience in that they tended to occur earlier in the sleep cycle, were more likely to be replicas of actual events, and were more commonly accompanied by gross body movements. Traumatic nightmares may arise out of varying stages of sleep and are not confined to REM sleep alone. The group with lifelong nightmares showed evidence of thought disorder on the Rorschach. The men with PTSD had failed to psychologically integrate their traumatic experiences and used dissociation as a way of dealing with strong affects.

WOODWARD, S.H., ARSENAULT, N., BLIWISE, D.L. & GUSMAN, D.F. (1991a). Physical symptoms accompanying dream reports in combat veterans. *Sleep Research*, 19, 153. Five nights of self-report data, consisting of awakening times, dream types, and physical symptom(s), were collected from 18 Vietnam combat veterans enrolled in a PTSD inpatient treatment program. Self-reports were made when subjects awoke spontaneously and judged that they would remain awake for some time. Sweating reports were associated almost exclusively with awakenings on which Vietnam nightmares were also reported. Tachycardia reports were associated with awakenings including reports of all dream types; furthermore, in later sleep cycles, tachycardia reports were associated with Vietnam and non-Vietnam nightmares at similar rates. However, early in the night, tachycardia reports were specific to awakenings including Vietnam nightmare reports. These data are generally in accord with the established link between dream content and physiologic arousal in normal volunteers.

WOODWARD, S.H., ARSENAULT, N., BLIWISE, D.L. & GUSMAN, D.F. (1991b). The temporal distribution of combat nightmares in Vietnam combat veterans. *Sleep Research*, 19, 152. Five nights of self-report data, consisting of awakening times, dream types, and physical symptom(s), were collected from 18 Vietnam combat veterans enrolled in a PTSD inpatient treatment program. "Vietnam" nightmares exhibited an increase in frequency early in the night. In contrast, the distribution of non-Vietnam nightmares and pleasant dreams appeared consistent with the normative distribution of REM time. Expressed as a proportion of "normal" dreams, the frequency of "Vietnam" nightmares decreased monotonically after the initial burst. These data reinforce earlier suggestions that the early sleep cycles deserve special attention in polysomnographic studies of PTSD.

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PILOTS UPDATE

We have been encouraged by the heavy use that the PILOTS database has received since it became available on the Dartmouth College Library Online System last October. We have heard from many PILOTS users, most of whom encountered no difficulty in logging onto the database and searching it. There are a couple of problems that have been reported by several users; fortunately, these are easily solved.

- If you are having trouble dialing into the Dartmouth computer, be sure that your communications software has been programmed to dial any necessary prefixes and pauses. For example, many users of the U.S. government's FTS network must dial "8" for a long-distance dial tone, and then the area code and telephone number for Dartmouth. Others may need to dial "9" for an outside line. Check with your institution's telephone operator for local details.

- If you are having trouble printing out the results of your search, check to see if you have turned on the "file capture" feature of your telecommunications software package. (Consult your software manual for instructions.) Once you are logged on to the Dartmouth College Library Online System, be sure to type the command SET PAGING OFF before displaying any search results. By doing these two things, you will assure that your search results display will scroll across your screen and into a file in your computer's memory. You will then be able to manipulate this file with a word processor or database program after you have logged off the Dartmouth computer.

- If your search results are not in the order that you would like, use the LIMIT and SORT commands during your search session. Type EXPLAIN LIMIT or EXPLAIN SORT for instructions.

As you use the database, you may search for topics that are difficult to find because they are not covered well by our indexing vocabulary. Please let us know of these; we shall be revising the PILOTS Thesaurus later this year, and we can add or change indexing terms as part of that revision. We welcome any comments and suggestions that we might apply toward improving the PILOTS database.

PTSD RESEARCH AT THE ST. CLOUD VAMC

Charles G. Watson, PhD

The St. Cloud PTSD research program has concentrated on the description of PTSD, its measurement, and its risk factors.

Definition and Description of PTSD. PTSD research at St. Cloud began in the early 1980s with efforts to identify the symptoms of the disorder. In an early study, Melodie Van Kampen and I examined the correlations of each DSM-III PTSD symptom with eligibility for a PTSD diagnosis. Our results suggested that the most characteristic symptoms of PTSD are those dealing with reexperiencing of the trauma. In contrast, some other items (e.g., survival guilt, concentration problems) did not correlate significantly with eligibility for PTSD diagnosis, suggesting that they might be deleted from the diagnostic manual. In a second study, we compared PTSD symptom self-ratings of patients reporting delayed and undelayed onsets. They did not differ, which argued against categorizing delayed-and-undelayed-onset PTSD as separate subtypes, as had been done in DSM-III. In a third study, Douglas Anderson and I factor analyzed the DSM-III symptoms, hoping to determine how they might best be categorized in future DSM editions. The findings (separate Intrusive Thoughts, Arousal, Impoverished Relationships, Guilt, and Cognitive Interference factors) gave more support to the DSM-III-R system than to earlier ones, but suggested additional changes as well.

In a current study, Mark Juba and I are attempting to identify the specific characteristics (e.g. baseline, length of response, peak amplitude, acceleration and deceleration rates, etc.) of the physiological hyperarousal found in PTSD.

Psychometrics. Our primary effort in this area has been the development of the Posttraumatic Stress Disorder Interview (PTSD-I). It consists of 177-point self-ratings closely reflecting DSM-III-R standards. It generates both binary present/absent and continuous severity outputs for each symptom and for the entire disorder. It offers high test-retest reliability, internal consistency, and validity.

We reviewed the empirical literature on the strengths and weaknesses of 12 PTSD measures in a 1990 article. Those with the most encouraging validities were our PTSD Interview (PTSD-I), the Structured Clinical Interview for DSM-III-R PTSD module, and Keane et al.'s Mississippi Scale. In a subsequent comparative validation, we also found the PTSD-I and Mississippi Scale offered better validity than the Diagnostic Interview Schedule PTSD module or the Keane et al. MMPI PTSD scale.

Risk Factors. The primary focus in our current research is the identification of factors influencing risk for PTSD after trauma exposure. Like other studies, our results suggest that rebellious adolescent behavior, such as drinking and conflict with authority, does not predict PTSD. Nor did self-reports of childhood PTSD-like behaviors (such as nightmares, social withdrawal, or easy startling) predict

later PTSD. Patricia Thuenes-Hontos and I also found PTSD symptoms reported with equal frequency in the files of Vietnam veterans entering our hospital in the 1970s and in those of Korean War patients treated here in the 1950s. This suggested that the peculiar circumstances surrounding the Vietnam War may not have contributed to PTSD risk, contrary to popular folklore. Additionally, Rev. Gary Berg, our Chaplain Service Chief, has produced evidence that high moral development is associated with a dampening of PTSD's symptoms after exposure to severe trauma. We have also studied the effects of stresses which occur before trauma on risk for PTSD in two studies. The results of the first suggested that exposure to stress leads to a psychological "vaccination" which reduces the ability of a later trauma to cause PTSD. However, our second study yielded negative results and failed to confirm this finding.

In our current Merit Review program, Butch Nugent and I are studying the relationship of PTSD to each of 45 other disorders in a large help-seeking population. We are also collecting data on the sequence in which trauma, PTSD, and comorbid disorders develop. This may help identify the effects that trauma, PTSD, and other conditions have on one another.

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Do Women Somatize More Than Men?

Gender Differences in Somatization

CAROL A. WOOL, M.D.

ARTHUR J. BARSKY, M.D.

Reviewing the literature of the latter half of the twentieth century, the authors consider the question: do women somatize more than men? The literature review begins with work done in the 1950s in order to look at the phenomenon of somatization as a constellation of symptoms. It encompasses work done in the general community and in the medical arena. The critique of the literature shows why the role of gender in somatizing remains unclear, elucidates inconsistencies, notes the confounding variables, and points out the degree of variable interaction and observer bias. Possible explanations or causes of gender differences are explored. In the present body of literature, women do somatize more than men; however, some of the studies in the literature are flawed. The changing gender difference in medical literature implies that the inquiry at hand concerns the etiology and expression of somatization itself.

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It has long been held that women report more functional somatic symptoms than do men. In 1900 B.C. the ancient Egyptians made note in the Khun Papyrus of a "woman aching in all her limbs with pain to the sockets of her eyes,"¹ a complaint often echoed today. Both the Egyptians and Greeks ascribed the etiology of mysterious female pains to *hysteria*, which is Greek for "wandering uterus." In a therapeutic effort to attract the uterus into proper alignment, sweet smelling balms and herbs were placed at the vagina and noxious potions were positioned at the nostrils. The assumption that only women could display the syndrome has continued into modern times. Despite reports by Sydenham in the seventeenth century and Charcot in the nineteenth that men displayed the same symptoms, the concept of hysteria has been inextricably bound to gender. An additional difficulty is that the term hysteria has been used to describe various conditions: somatic symptoms accom-

panying depression or anxiety, a personality trait, or a conversion reaction.^{2,3}

Over the last 40 years, efforts have been made to put aside the term hysteria and to study somatizing free from its confusing legacy. In addition, a distinction has been made between the use of the term "somatization" to refer to a tendency or process and somatization as a disorder. In the former sense, somatization refers to an almost universal propensity to experience and express psychiatric disorders and psychosocial distress as somatic distress and discomfort. Somatization is prominent in many psychiatric

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disorders, including anxiety disorders, depressive disorders, and the somatoform disorders. Somatization that occurs in the course of anxiety and depressive disorders is an important but large subject that we will not include in this review. The second use of the term "somatization" refers to a specific psychiatric disorder, "somatization disorder," a discrete pathological condition characterized by multiple, chronic, somatic symptoms without a medical explanation, accompanied by medical help-seeking behavior.

LITERATURE REVIEW

We will consider descriptive epidemiological studies on gender and somatic symptom reporting, including surveys of patients and community samples that use various instruments and taxonomic schemes. The literature will include work on somatization in general and on somatization disorder in particular. Several observations have consistently emerged: women endorse more somatic symptoms than men and report more disability due to illness than men, even after adjusting for the presence of gynecological disease and symptoms.⁴⁻⁶

In 1951, Purtell et al.⁷ published the first paper conceptualizing hysteria as multiple somatic complaints rather than as intrapsychic drive and defense. The researchers described patients referred for psychiatric consultation with unexplained somatic complaints. These subjects were diagnosed with "hysteria" when no other medical, neurological, or psychiatric diagnosis could account for their symptoms. The "hysterical" patients were young (mean age = 25.7 years) and had over 40 symptoms, some of which we would now classify as depressive or anxious. It was noteworthy that these patients were all female. In a second study, Purtell et al. examined a group of men with somewhat similar symptoms, but considered them to have a different condition, "compensation neurosis," because their symptoms were connected with efforts to gain recompense.⁴

Also, in the 1950s large community surveys using the Minnesota Multiphasic Person-

ality Inventory (MMPI) reported that women, more commonly than men, endorse somatic symptoms generally considered functional.¹⁰ The hypochondriasis scale of this instrument is composed of a series of functional somatic symptoms: in 1963, McDonald and Gynther¹¹ reported that white women scored higher than white men on this scale, but that in African-Americans, this gender difference persisted only among those in lower social positions. Green, in 1980,¹² found that women's scores on this scale exceeded men's, but that this difference was not seen among college-age respondents. MMPI hypochondriasis scale scores are also known to vary with ethnicity and educational level. The 1989 revised scale shows some decrease in this difference between men and women.¹³

Recently, community surveys with other self-report instruments to measure somatization have had somewhat contradictory results. Pennebaker and Roberts,¹⁴ for example, using a self-rating scale of somatic symptoms, found no consistent differences between male and female university students. Another study¹⁵ compared diagnoses from subjective self-reports of medical history with those of an objective medical evaluation. Using a self-report of symptoms alone, women were more likely judged to have hypertension and heart disease than men; however, no gender difference was found with objective clinical examinations. Phillips and Segal¹⁶ found compatible results, whereby gender differences were smallest or nonexistent when very localized or concrete symptoms were reported. However, women had more vague and diffuse concerns than men.

In the late 1980s, investigators again returned to the hospital wards to study somatization disorder. deGruy et al.¹⁷ reported on 213 medical and surgical inpatients at a university hospital. Nine percent of this randomly selected sample met DSM-III criteria for somatization disorder. Fourteen percent of women patients, but only 3% of men, met the criteria. There were no significant ethnic differences. Interestingly, somatization disorder patients were more likely to be separated, divorced, or widowed than

married or never married, and there was a significantly higher proportion of single parents among this group.

Because so many studies describe women with somatization disorder, Smith et al.¹⁸ requested the referral of male patients with unexplained somatic symptoms from 300 primary care physicians in Arkansas. They found nine men with somatization disorder. These men were of low socioeconomic status, and there was often a "dramatic precipitating event as a harbinger of their illness." Most had other comorbid psychiatric disorders such as alcohol abuse and major depression. One possible interpretation of these findings is that men do not present with somatic complaints until there is greater disruption in their lives, which is compatible with work showing that men referred for psychiatric treatment have more comorbid psychopathology than women. Slavney and Teitelbaum¹⁹ reported on 100 consecutive patients with medically unexplained symptoms referred for psychiatric consultation from the medical and neurological services of a general hospital. They found that the generation of psychiatric referral was much less likely in men; once referred, however, men were more likely to have a DSM-III diagnosis of somatization disorder, dissociative disorder, or factitious disorder.

Nevertheless, Golding et al.²⁰ compared the clinical characteristics of 30 men and 117 women with multiple unexplained somatic symptoms. They found no differences in diagnostic status, symptom patterns, functional impairment, self-report health status, psychiatric comorbidity, and demographic characteristics. Golding and colleagues agreed with Slavney and Teitelbaum in finding that the influence of the referral process was salient: more women were referred from a primary care setting and more men responded to a television story advertising the study.

Data on gender and somatization have also come from the Epidemiologic Catchment Area (ECA) Study. This large multicomunity survey of psychiatric disorders employed the Diagnostic Interview Schedule (DIS) and

included the 40 somatic complaints that are the component symptoms of somatization disorder. The prevalence of these symptoms, as reported by Escobar²¹ in 1987, was greater in women than in men and in those with psychiatric comorbidity, particularly dysthymia and major depression. Escobar also noted the importance of ethnicity in this relationship: Mexican-American women were found to somatize more than non-Hispanic women. Swartz et al.,²² using ECA data, reported that somatization was more common in urban residents than rural dwellers. The differences in residence were greatest among women and high school graduates. Somatization was associated with being older (45-64), as well as being separated, widowed, or divorced. There was an inverse relationship with educational level and no relationship with ethnicity.

Cloninger et al.^{23,24} have focused not on gender difference in prevalence, but on differences in phenomenology between men and women somatizers. In reviewing the physical complaints and disability records of 1,600 people, the researchers found that somatizers fell into two distinct categories. One group, "the diversiform somatizers," were marked by a high number of brief sicknesses with diverse complaints, especially pain. "Asthenic somatizers," in contrast, have less diverse complaints and are more chronically disabled by fatigue, weakness, or common minor illnesses. Contrary to popular belief, asthenic somatizers were more likely to be male, whereas the reverse was true in the diversiform category. This possible gender-linked difference in phenomenology raises the question of inconsistencies in gender predominance across somatoform disorders. In this context, it is interesting that although the somatoform disorders as a group are diagnosed more often in women, hypochondriasis may be an exception because it is thought to be more equally distributed between the sexes.²⁵⁻²⁹

In summary then, although men have been diagnosed with somatization disorder and identified as somatizers, women still predominate. However, this perceived difference is much influenced by social variables, referral patterns

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and psychiatric comorbidity, changing cultural factors,²¹ and advances in research technique. Thus, the notion of somatization as an illness linked with hysteria exclusively affecting women has changed since the 1950s. The influence of gender may reflect more the pattern of somatization than its prevalence.

ANALYSIS OF THE LITERATURE

In the 1950s, particularly in the work of Purtell et al.,²² the concept of somatization was differentiated neither from hysteria nor from other psychiatric diagnoses, such as depression and anxiety disorders.

It has only been since the 1980s that identifying variables that may confound the relationship between gender and somatization—for example, age,^{21,22,30} social position,^{31,32} ethnicity,^{21,33} race,¹⁹ acculturation,²¹ culture,^{37,38} psychiatric comorbidity,^{21,29,33} and domicile^{22,34}—have been considered. The complexity of considering all these variables in one study means that work must focus on only one or two of the pertinent variables. In addition, although it is a monumental task to sample a broad population, these multiple influences mean that generalizing from a particular group is, as Lipowski notes,¹¹ dangerous.

The relationship between gender and somatization may differ in medical patients and in community samples. If, for example, women have a lower threshold for visiting a physician with a somatic symptom, then we would expect the gender difference to be greater in patient samples than in community samples. Indeed, in patients aged 17 to 44 years women visit the doctor and are hospitalized twice as often as men. After 45 years of age, women have 20–40% more doctor visits than men.^{5,6} Thus, the work of Purtell et al.⁷ and deGruy,¹⁷ which noted female gender prevalence through inpatient data, may be flawed.

Work comparing community samples using self-reports and the DIS illustrates the importance of interactional effects of variables when surveying gender differences. In one study, urban dwellers endorsed more somatic symp-

toms than rural dwellers. In addition, two interactional effects were found. The magnitude of the difference between these two populations is greatly affected by gender and educational level. Female high school graduates in the urban population endorse 1.08 more symptoms, and male high school graduates report only 0.37 more symptoms. Not accounting for the confounding interactive effects of these variables has led to some contradictory and confusing results in the literature.

A broad cultural context influences the kinds of research questions that are formulated and shapes the ways in which they are studied. This too influences the degree to which women are found to somatize and reflects broader cultural attitudes toward women. The current findings of an inverse relationship between somatic symptoms and social position^{31,32} contrast sharply with widely held beliefs in the past. Ehrenreich and English¹⁹ have noted that from 1865 until about 1920, educated, affluent women were seen as frail and sickly; conversely, "sickness was seen as feminine" (p 22). The lower-class women who worked in the factories or who were the servants to the rich were seen as "inherently healthy and robust" (p 12). Such historical perspectives serve to caution us that illness and somatization can and do reflect cultural norms. How these sociocultural factors affect gender and somatization has not been studied, but they may bias the literature to date.

POSSIBLE EXPLANATIONS OR CAUSES OF GENDER DIFFERENCES

Even after these caveats have been considered, it may well be that women somatize more than men. At least five possible mechanisms may contribute to this phenomenon. These include gender differences in the willingness to admit to discomfort; the readiness to seek medical attention; the prevalence of psychiatric disorders with prominent somatic features; innate differences between men and women in their threshold, tolerance, and sensitivity to minor bodily sensation; and differences in relational patterns.

Admitting Discomfort

The predominant cultural ethos in the United States has impressed men more than women with the importance of not crying or "acting like a baby," of maintaining a "stiff upper lip," and of not acknowledging weakness or distress.⁴¹ This may make men more reluctant to admit to an interviewer or investigator somatic distress and feelings of illness. Thus, some of the differences in somatization between men and women may actually be different in reportorial style, not differences in bodily experience. In addition, this style may have changed over the last 40 years: changes in the MMPI, as noted earlier, support this point.

Readiness to Seek Medical Attention

Second, as we speculated before, men and women may differ in their willingness to seek medical attention. Women apparently have a lower threshold for visiting the doctor;^{3,41,43} thus, they seek attention for relatively more benign illnesses, trivial symptoms, and self-limited dysfunction. The apparent gender difference in somatization might actually therefore result from gender differences in sick role behavior rather than from differences in bodily sensation. As Mechanic notes, women not only report more symptoms more frequently than men, but they also use internists and psychiatrists more frequently.⁴⁶ Psychologically distressed people who have no support may and often do turn to the medical care system for help. Differing role responsibilities, role strains,⁴⁴ and vulnerabilities, as well as the accessibility of health care might explain why women turn to physicians more than men.

Psychiatric Disorders With Prominent Somatic Features

Women might somatize more because they more frequently have psychiatric disorders with prominent somatic features. Depression may be the most important of these disorders because it is more common in women¹⁵⁻⁴⁹ and

frequently includes, and even presents, with somatic symptoms.^{50,51} This effect may be even more pronounced in medical populations,⁵² where it has been reported that depression most often presents with somatic⁵³ rather than psychological complaints.⁵¹ Anxiety disorders, especially panic, can also present with somatic complaints.⁵³ These disorders are also more prevalent in women.⁵⁴ Panic disorder is reported in 1.6–2.9% of women and 0.4–1.7% of men.⁵⁵

The epidemiology of depression and anxiety in the general population may also have changed over the last century. Studies in the United States, Canada, and Sweden suggest that as time has passed, the prevalence of depression and anxiety disorders in men and women, at least in some age groups, has tended to equalize.⁴⁶

Etiologic Factors

Another possible explanation for differences in somatization among men and women is a difference in one predisposing factor, trauma. If childhood physical and/or sexual trauma predispose one to somatize later in life,^{56,57} then a higher incidence of such trauma in girls might explain a higher prevalence of somatization in women. A growing body of literature suggests that childhood physical and sexual abuse do, indeed, result in a tendency to experience more bodily distress and report more functional somatic symptoms in adulthood.⁵⁷ In addition, women who are abused as adults often present to their physician with somatic complaints as a way of getting help because of fear of asking for help directly.⁵⁸

Innate Differences in Bodily Perception

It is also possible that women are simply more sensitive to bodily stimuli and experience more somatic distress than men. Little is known about visceral interoception in men and women. However, some work suggests that male and female college students process visceral and somatic sensation differently.⁵⁹ In determining

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whether a bodily sensation is significant, what it might be caused by, or how intense it feels, women apparently use more situational and circumstantial cues and more external information than men do. Men, on the other hand, focus more on the somatic sensation itself and rely less on gathering information about the sensation. Pennebaker and Roberts have studied the estimation of blood glucose levels by diabetic persons in a controlled environment in which blood glucose was experimentally manipulated. The men and women were equally accurate at this task in the laboratory, but when the task was repeated at home, where more external cues were present, the men continued to match the laboratory accuracy while the women's estimates became more variable. Similar results were obtained with estimates of heart rate, stomach activity, and blood pressure. The authors concluded that men's visceral sensation tends to be more consistent over time and more independent of the circumstances or situations they are in at the moment they experience the sensation. Pennebaker and Roberts¹⁴ suggest that greater knowledge of brain functioning may provide an explanation for the gender differences in the appreciation of internal cues. He argues that increased laterality in male brains might facilitate such appreciation.

Bodily amplification, defined as the tendency to experience benign bodily sensation as noxious and intense, encompasses three components: bodily hypervigilance; the tendency to select out and focus on certain relatively mild or infrequent sensations; and a tendency to experience bodily sensation as abnormal and symptomatic of disease, rather than normalizing it. Amplification, assessed with a self-report questionnaire, has been found to be unrelated to gender.¹⁵

The perception of symptoms that are vague, mild, and ambiguous is much more variable and subjective than the perception of symptoms that are severe, circumscribed, or due to an obvious external cause.¹⁶ There is therefore more room for psychological factors such as past experiences, mood, and other people's

opinions to influence the intensity with which such symptoms are experienced. If women tend to use more contextual, situational, and circumstantial clues in deciding how ominous, intense, and alarming a given bodily sensation is, then this tendency would be strongest with relatively mild and functional symptoms. The few existing data are compatible with this prediction.^{15,16}

Relational Patterns

The work on gender differences in symptom appraisal and information processing may relate to an emerging body of literature on women's development, the development of cognition, and interpersonal bonds in women. Gilligan⁶¹ notes that "woman's development point[s] toward a different history of human attachment, stressing continuity and change in configuration, rather than replacement and separation. . . ." Miller⁶² describes women's sense of self as "organized around being able to make and then to maintain affiliations and relationships." This orientation might explain why women outside an isolated laboratory would use external cues and information sources more than men because they would be far more attuned to the input from those around them. They might also use others as sounding boards for their fears and suspicions about symptoms. This could lower their threshold for bringing these complaints to medical attention or endorsing them in community surveys. In these ways, social interaction might serve to increase women's presentation with somatic complaints while dampening this behavior in men.

CONCLUSION

The research in gender differences in somatization disorders suggests, however inconclusively, that women report more functional symptoms than men. Although this has changed in the recent literature, fundamental questions about symptom appraisal and reporting, socio-cultural influences, and developmental factors

are all raised by a review of the literature. This is an important area with implications not only for psychiatric disorder, but also for the different presentation of medical disease as well. As such, it deserves further intensive investigation.

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FACTS ABOUT

***WOMEN IN THE U.S. ARMED SERVICES:
THE WAR IN THE PERSIAN GULF***

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★ ★ ★ WOMEN IN THE U.S. ARMED SERVICES: THE WAR IN THE PERSIAN GULF ★ ★ ★

U.S. forces in the Persian Gulf War, the first large-scale U.S. military operation since the establishment of the All Volunteer Force, numbered over 537,000 men and women, including approximately 100,000 reservists. An additional 128,000 reservists were activated and assigned to military installations in the United States and Europe.

Over 33,300 U.S. military women served in key combat-support positions throughout the Persian Gulf region. Women piloted and crewed planes and helicopters, directed artillery, drove trucks, ran prisoner-of-war facilities, served on support and repair ships and in port security units and construction battalions, and did a myriad of other jobs crucial to the success of Operations Desert Shield/Desert Storm. And, of course, many women served in the vital medical and administrative jobs where women have always been well represented.

The important roles performed by military women in the Persian Gulf war reflect the record proportions that women have reached in the active and reserve components of the U.S. military services since 1973. Although better represented in some services than in others, women are integral in all the services. Today almost 378,550 women are members of the U. S. Armed Services, constituting 11 percent of all active duty personnel and 13 percent of the ready reserves.¹

Here are some key facts about women in each of the U.S. services, followed by a summary of information about women in the forces of other countries allied against Iraq in the Persian Gulf.²

ARMY

- Positions currently open to women: 52 percent *

There is no statute that explicitly restricts the assignment of women in the Army, but it is Army policy to exclude women from positions it determines would have routine engagement in direct combat.

Women in the Total Army Force:

- 83,200 active duty women (11 percent of the active duty force)²
- 63,100 women in the Army Reserve (21 percent of the Army Reserve)
- 31,500 women in the Army National Guard (7 percent of the Guard)

Women deployed to the Persian Gulf: 26,000

■ Army women participated in the initial invasion into Kuwait and Iraq. They were assigned to forward support units in the following specialties: flying helicopters to transport personnel, equipment, and supplies; air defense artillery; military police; intelligence; transportation; ordnance; chemical and biological warfare; special operations; communications; medical search and rescue; and with medical facilities forward in the battle area.

■ About 270 women served with U.S. Patriot missile battalions in Saudi Arabia, Israel, and Turkey.

■ Two women commanded battalions--a Military Police battalion and a Material Maintenance battalion--in Operation Desert Storm. Women were also in command of companies, aircraft squadrons, and platoons and squads in a variety of units.

■ Female reservists deployed by the Army performed the following functions: medical, chemical defense and decontamination, transportation, construction, maintenance, supply, communications,

* This includes women in the Coast Guard. See sections on the individual services for specifics about the various components of the reserves; see appendix for a definition of "ready reserves."

² WREI wishes to thank the Army, Navy, Marine Corps, Air Force, Coast Guard, and Department of Defense (DOD) Reserve Affairs for their cooperation in verifying information. Information on military women in allied militaries was provided by DOD.

³ All personnel numbers for Army, Navy, Marine Corps, Air Force, and Coast Guard are rounded to the nearest hundred; percentages are rounded to the nearest whole number.

legal, military police (law enforcement, prisoner-of-war control, and vehicle traffic control), general administration, finance, data processing, utilities operation, civil affairs, intelligence, military history, public affairs, postal, graves registration, and rear area operations control.

- Eleven Army women lost their lives in Saudi Arabia. Five of the 122 U.S. troops killed in action were Army enlisted women. Two women, a truck driver and a flight surgeon, were among the 25 U.S. personnel held prisoner of war by Iraq; both received the Purple Heart for combat injuries.

NAVY

- Positions currently open to women: 59 percent *

Job assignments for Navy women are restricted by statute and Navy policy: women cannot serve on ships, or fly aircraft, that are expected to be engaged in a combat mission. However, women are allowed to serve temporary duty on combat ships as well as to train men to fly combat planes. Women can be assigned to selected ships of the Combat Logistics Force, to Navy auxiliary ships such as repair, research, and training vessels, and to civilian contract ships. Some 8,500 Navy women currently serve on over 70 Navy and civilian ships.

Women in the Total Navy Force:

- 57,100 active duty women (10 percent of the active duty force)
- 23,100 women in the Navy Reserve (14 percent of the Navy Reserve)

Women deployed to the Persian Gulf: 2,500

- Navy women served on hospital ships, supply ships, oilers and ammunition ships of the Combat Logistics Force, and repair ships.
- Women Navy pilots flew helicopters and reconnaissance aircraft.
- Women served in Navy construction battalions, fleet hospitals, reconnaissance squadrons, and as public affairs officers.
- Female Navy reservists in the Gulf performed medical, port and harbor security, sealift and shipping coordination, intelligence, logistics, communications, and cargo handling duties.

MARINE CORPS

- Positions currently open to women: 20 percent *

The Marine Corps is a part of the Department of Navy; therefore, job assignments for Marine Corps women are subject to the statutory prohibitions that pertain to Navy women, as well as to other restrictions imposed by Corps policy.

Women in the Total Marine Force:

- 9,300 active duty women (five percent of the active duty force)⁴
- 1,800 women in the Marine Corps Reserve (five percent of the Marine reserve)

Women Marines in the Persian Gulf: 1,000

- The women Marines who served in Saudi Arabia were the first female Marines deployed to any conflict since the Vietnam era.
- Women Marines were assigned to logistics, intelligence, transportation, communication, aviation support, administration, and public affairs duties.

* One reason that the female percentage of Marine Corps personnel is lower than the other services is that the Corps has no medical or chaplain branches of its own; it receives these services from the Navy.

AIR FORCE

- Positions currently open to women: 97 percent •

Women are prohibited by statute from serving in aircraft engaged in a combat mission. It should be noted, however, that female medical, dental, chaplains, and other such professionals are specifically exempted from this exclusion.

Women in the Total Air Force:

- 73,600 active duty women (14 percent of the active duty force)
- 16,000 women in the Air Force Reserve (19 percent of the reserve force)
- 15,500 women in the Air National Guard (13 percent of the Air Guard)

Women deployed to the Persian Gulf: 3,800

- Active and reserve women served in military airlift, airlift terminal and cargo management, aerial refueling, communications, intelligence, firefighting, aeromedical evacuation, and a wide variety of support activities similar to those performed by the Army.
- Air Force women pilots flew and crewed strategic transport, tactical transport, tankers, reconnaissance (AWACS), and aeromedical airlift aircraft.

COAST GUARD

- Positions currently open to women: 100 percent •

Although a uniformed service, the Coast Guard is part of the Department of Transportation, and the statutory restrictions that pertain to military women in the Department of Defense do not apply to Coast Guard women. Women have served aboard Coast Guard ships since 1977.

Women in the Total Coast Guard Force:

- 2,600 active duty women (seven percent of the active duty force)
- 1,750 women serve in the Coast Guard Reserve (15 percent of the reserve force)

Women deployed to the Persian Gulf: 13

- Coast Guard women serving in the Gulf were assigned to port security positions.

ALLIED NATIONS

Women are known to have been included in the forces of the following nations of the coalition of nations aligned against Iraq:

- Canada deployed about 150 women (3 percent of Canadian personnel deployed), who served on combat ships, in combat support positions, and on the Canadian hospital ship.
- France deployed thirteen women (out of 10,000 French personnel deployed), who served in medical positions.
- Great Britain deployed approximately 800 women (1.5 percent of Great Britain's personnel deployed). Fifty two women served on combat ships of the Royal Navy.
- Kuwait: Nine women were among 250 Kuwaiti volunteers trained at Fort Dix, N.J., before being assigned to U.S. Army units in the Persian Gulf region.

APPENDIX - COMBAT EXCLUSIONS

There is no law that prohibits women from "serving in combat." The statutes, which do not apply to the Army, specify only that women may not serve on ships and aircraft engaged in combat missions. However, nothing in the law bars the services from applying combat exclusions to units other than ships or aircraft, and all the services have done so. More important, the law does not define "combat mission." That task is left to the discretion of DOD and the individual services, and how they define combat determines what jobs are closed to women.

Statutory restrictions on women in the U.S. military

- *Title 10, U.S.C. 6015* applies to the Navy and Marine Corps. It states:

Women may not be assigned duty on vessels or in aircraft that are engaged in combat missions nor may they be assigned to other than temporary duty on vessels of the Navy except hospital ships, transports, and vessels of similar classification not expected to be assigned to combat missions.

In addition, Marine Corps policy prohibits the assignment of women Marines to any unit within which they would likely become engaged in direct combat operations with the enemy, or to any assignment that has been designated by the Secretary of the Navy as requiring "an armed combat trained Marine."

- *Title 10, U.S.C. 8549* applies to the Air Force. It states:

Female members of the Air Force, except those designated under section 8067 of this title, or appointed with a view to designation under that section, may not be assigned to duty in aircraft engaged in combat missions. (The exceptions designated under Section 8067 are medical and dental professionals, and chaplains and other professionals.)

- No statute restricts the assignment of women in the Army. The statute that covers the Army, *Title 10, U.S.C. 3012*, gives the Secretary of the Army authority to determine personnel policy for the Army. The Secretary of the Army has developed policies that exclude women from "routine engagement in direct combat." The Army justifies its exclusionary policies as being consistent with an implied Congressional intent (which is explicit in the Navy and Air Force exclusionary statutes).

Terms and Definitions

Direct Combat: Direct combat is defined as "engaging an enemy with individual or crew-served weapons while being exposed to direct enemy fire, a high probability of direct physical contact with the enemy's personnel, and a substantial risk of capture. Direct combat takes place while closing with the enemy by fire, maneuver, or shock effect in order to destroy or capture, or while repelling assault by fire, close combat or counterattack."

Risk Rule: Developed in 1988 by a DOD Task Force on Women in the Military in an attempt to standardize positions closed to women across the services, the risk rule states that "non-combat units can be closed to women on grounds of risks of exposure to direct combat, hostile fire, or capture provided that the type, degree, and duration of such risks are equal to or greater than that experienced by combat units in the same theater of operations."

Combat Support: Combat support positions provide operational assistance to the combat arm. Army and Air Force women are fully integrated in combat support roles and specialties; Marine Corps women are not. Navy women serve on selected "underway replenishment ships" of the Combat Logistics Force (CLF) that ferry supplies, fuel, and ammunition from port to the CLF ships that support the battle group. Navy policy precludes permanent assignment of women to CLF ships that sail with the battle group.

Combat Service Support: Combat service support positions provide logistical, technical, and administrative services—such as, for example, personnel and finance—to the combat arm. Military women in all branches serve in combat service support roles.

Ready Reserve: The ready reserve is divided into two subcategories: the Select Reserve and the Individual Ready Reserve (IRR). Members of the Select Reserve are assigned to units, perform approximately two weeks of active duty training each year and at least one weekend of inactive duty training or "drill" per month. Members of the Individual Ready Reserve are not assigned to units. The Army activated approximately 20,000 men and women of the IRR in the following specialties to serve as "fillers" to bolster understrength units: medical personnel, truck drivers, mechanics, supply personnel, and artillery personnel.

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Women in the U.S. Armed Services: The War in the Persian Gulf was prepared by Carolyn Becraft, March, 1991.

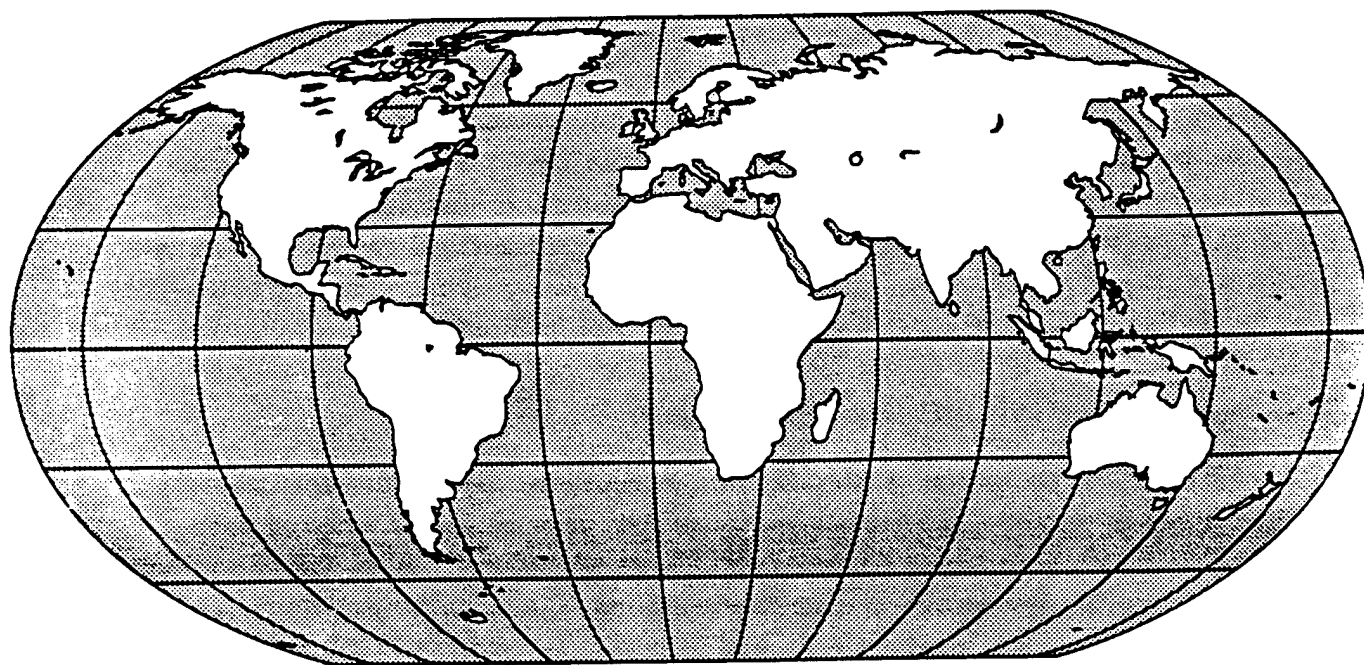
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1992 Worldwide Survey
of Substance Abuse and Health
Behaviors Among Military Personnel



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EXECUTIVE SUMMARY

Background

This report presents the results of the 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel. This study is the fifth in a series of surveys of military personnel conducted in 1980, 1982, 1985, 1988, and 1992 under the direction of the Department of Defense. All of the surveys investigated the prevalence of alcohol use, illicit drug use, and tobacco use, and the consequences of alcohol and other drug use. The 1985 and 1988 surveys also examined health behaviors other than substance use on the quality of life of military personnel. In 1992, we broadened this aspect of the survey to give greater emphasis to health risks, knowledge and beliefs about AIDS transmission, and nutrition. In addition, in the 1992 survey we examined the impact of Operation Desert Shield/Desert Storm on substance use rates; included questions to assess problem gambling in the military; gathered information to estimate selected medical costs of heavy cigarette smoking and heavy drinking among active duty personnel; and made more extensive comparisons with civilian data.

Survey Population and Response Rate

The eligible population of the 1992 survey consisted of all active-duty military personnel except recruits, Service academy students, persons absent without leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. Usable questionnaires were obtained from 16,395 military personnel (4,886 Army, 4,002 Navy, 2,509 Marine Corps, and 4,998 Air Force) for a 77.3% response rate.

Overview of Trends in Substance Use, Negative Effects, and Health Behaviors

During the past 30 days for the total DoD:

- Any illicit drug use declined sharply from 27.6% in 1980 to 3.4% in 1992. This decline was not explained by changes in the sociodemographic composition of the military since 1980.
- Cigarette smoking decreased significantly from 51.0% in 1980 to 35.0% in 1992. As was the case with illicit drug use, this decline was not explained by sociodemographic changes during the survey years.
- Heavy alcohol use declined significantly from 20.8% in 1980 to 15.2% in 1992. However, much of the decline in heavy drinking since 1980 can be attributed to changes in the sociodemographic composition of the military since 1980 rather than to military efforts to curb heavy drinking. The lower rate of heavy drinking in 1992 is explained by a larger proportion of the military being in demographic groups that were less likely to be heavy drinkers than in 1980.

Comparisons of findings from the 1988 and 1992 surveys show that the rates of illicit drug use and cigarette smoking declined significantly, but heavy drinking did not.

- Although heavy drinking did not decrease significantly between 1988 and 1992, the overall rate of alcohol use did decline significantly from 82.8% to 79.6%, primarily due to a decrease in the rate of moderate/heavy drinking from 28.8% to 26.1%.
- We observed significant declines from 1980 to 1992 in alcohol-related serious consequences experienced during the past year (17.3% to 7.6%); productivity loss during the past year (26.7% to 16.4%); and dependence symptoms during the past year (8.0% to 5.2%). However, only alcohol-related productivity loss declined significantly relative to 1988.
- We observed significant declines from 1980 to 1992 in the percentage of personnel with drug-related serious consequences during the past year (13.3% to 0.4%) and drug-related productivity loss during the past year (14.4% to 0.7%). Both of these declines were also significant relative to 1988.

Overall, these findings indicate that the military has made steady and notable progress during the past 12 years in combating illicit drug use and smoking and in reducing drug- and alcohol- related problems. DoD has made less progress in reducing the prevalence of heavy drinking.

Despite notable progress, there is still room for considerable improvement. Cigarette smoking remains common, affecting slightly more than one out of three military personnel. In addition, the rate of heavy drinking (i.e., the consumption level most likely to result in alcohol-related problems) affects about one in seven active duty personnel. Further, when we adjusted the estimates of heavy drinking to reflect changes in the sociodemographic composition of the military, we found that the 1992 rate had not changed significantly from the 1980 rate. This finding suggests that the observed decline in the unadjusted rates of heavy drinking from 1980 to 1992 were largely a function of changes in the demographic composition of the military.

Alcohol Use

- In 1992, 79.6% of military personnel were current drinkers with about two-thirds being moderate to heavy drinkers and 15.2% being heavy drinkers.
- The prevalence of heavy drinking decreased significantly from 1980 to 1992 for the Navy and the Air Force. Heavy drinking in the Army was at about the same level in 1992 as at the start of the Worldwide Survey series in 1980, and heavy drinking among Marine Corps personnel has not shown any significant declines across the survey years.

- The percentage of abstainers among total DoD personnel increased significantly, from 13.5% in 1980 to 20.4% in 1992. The percentage of abstainers also increased significantly between 1980 and 1992 for each of the four Services and between 1988 and 1992 for Army and Air Force personnel. For the Marines, however, the percentage of abstainers decreased significantly between 1988 and 1992 (i.e., the number of drinkers increased.) This increase occurred among moderate drinkers (14.0% in 1988 vs. 19.2% in 1992).
- Comparison of observed rates of heavy drinking (i.e., not adjusted for sociodemographic differences) showed that the prevalence for the Marine Corps (25.5%) was significantly higher than for the other Services. In addition, the rate for the Air Force (10.7%) was significantly lower than that for the Army (17.2%). There was no significant difference between Navy and Air Force rates (13.8% vs. 10.7%).
- Differences in the rates of heavy drinking between the Army and the Air Force, the Marine Corps and the Navy, and the Marine Corps and the Air Force were not explained by differences in the sociodemographic composition of these Services. However, if the sociodemographic compositions of the Services were the same, then the rate of heavy drinking in the Marine Corps would be expected to be about the same as the rate for the Army, and the Army would have a significantly higher rate than the Navy.
- Comparisons of heavy alcohol use between military and civilian populations (after adjusting civilian data to reflect the demographic composition of the military) indicated that military personnel overall and military men were significantly more likely than their civilian counterparts to drink and to drink heavily. The rate of heavy drinking for men aged 18 to 25 was roughly twice as high for military personnel as for civilians (25.9% vs. 13.8%). The drinking patterns of military women were more similar to those for civilian women.

Taken together, these findings suggest that the military has made some gains in reducing any alcohol use and heavy alcohol use among its personnel but that much more work is still needed. The prevalence of heavy drinking decreased significantly from 1980 to 1992 for the total DoD, the Navy, and the Air Force. Only the Air Force showed a significant decrease from 1988 to 1992. However, as noted above for total DoD, the reductions in heavy drinking between 1980 and 1992 appear to be more of a reflection of changes in the sociodemographic composition of the military than a result of programmatic efforts to reduce heavy drinking. In addition, heavy drinking is significantly more common in the military than among civilians.

Illicit Drug Use

- All Services showed the same pattern of significant decreases in past-30-day illicit drug use from 1980 to 1992 that was observed for the total DoD.

- Declines in past-30-day drug use between the 1988 and 1992 surveys were statistically significant for the Army and Air Force, while no statistically significant change was observed for the Navy or the Marine Corps. However, the Marine Corps data had an anomaly in that the trend line showed an apparent upturn. Although not a statistically significant shift, it is the first time since 1980 that the trend line for any of the Services has not maintained a downward pattern. Further exploration showed that the upturn was due to a statistically significant increase from 1988 to 1992 among junior enlisted personnel (E1-E3s).
- Even though we observed the highest rate of drug use among the Marines in 1992, when we controlled for sociodemographic differences, the Marine rate was reduced to a level comparable with the Army and Navy rates.
- When drug use did occur, it was most common among personnel in pay grades E1-E3. Unlike the 1988 survey, we found differences between men and women, with males more likely to be drug users.
- Military personnel (3.4%) were significantly less likely than civilians (9.8%) to have used illicit drugs. This pattern held for both men and women, across all age groups, and across all four Services.
- Marijuana remained the illicit drug most commonly used by military personnel.

In sum, illicit drug use among military personnel declined dramatically between 1980 and 1992 and is now the lowest since the survey series began. Although the declines are probably related in part to similar declines among civilians, drug use was significantly lower in the military than among civilians. Taken together, these findings demonstrate the continuing effectiveness of military efforts to eliminate drug use among military personnel.

Tobacco Use

- The prevalence of any cigarette smoking for the total DoD declined from 51.0% in 1980 to 35.0% in 1992. For all four Services, the prevalence of any cigarette smoking in 1992 was significantly lower than at the start of the Worldwide Survey series in 1980. For the Army, Navy, and Air Force, the prevalence of any smoking was also significantly lower than it was in 1988.
- The prevalence of heavy cigarette smoking (one or more packs per day) for the total DoD also declined significantly from 34.2% in 1980 to 18.0% in 1992. We observed similar overall trends in the decline in heavy smoking relative to 1980 for the Services. Rates of heavy smoking were also significantly lower than in 1988 for the Army, Navy, and Air Force.
- Despite the continued decline in smoking, the rates of any smoking in the total DoD and in all four Services were all still well above the 20% target for military personnel set for Healthy People 2000.

- An estimated 17% of all military personnel smoked cigars or a pipe in 1992, a decrease from 24% in 1988. Approximately the same percentage used smokeless tobacco in the past year, indicating no change since 1988.
- Among men aged 24 and younger, the prevalence of smokeless tobacco use in the past year was nearly twice as high as the rate for all personnel (32.5% vs. 17.4%). Between 1 in 4 and 1 in 3 young men in the Army, Navy, and Air Force used smokeless tobacco products in the past year. Nearly 1 in 2 (47.4%) of the young men in the Marine Corps used smokeless tobacco in the past year. These findings suggest that considerable effort will be needed to achieve the Healthy People 2000 objective of 4% current smokeless tobacco use among males aged 24 and younger.
- During the past year, 52.7% of smokers made an attempt to quit but only about 1 out of 4 of these succeeded.
- Military personnel overall continued to show higher rates of any smoking, compared to civilians (34.3% vs. 30.4%). However, the rate of heavy smoking for the U.S.-based military population (16.3%) was not significantly different from the overall civilian rate (16.0%). There were notable sex differences in this pattern of findings. Men followed the same pattern as total DoD whereas women showed the opposite pattern.
- Rates of any smoking were significantly higher among military men (34.9%) than among civilian men (30.8%), but rates of heavy smoking were not significantly different (16.1% military vs. 16.6% civilian). In contrast, rates of any smoking among military women (31.0%) were not significantly different from rates among civilian women (28.2%), but rates of heavy smoking were significantly higher (17.5% military vs. 12.1% civilian).

In sum, cigarette smoking has declined substantially among military personnel since 1980, particularly since 1985. These declines in part reflect similar declines among civilians but probably also reflect the emphasis of military smoking cessation and prevention programs. Nevertheless, military personnel overall are still more likely to smoke than are civilians. In addition, the rate of smokeless tobacco use in the military, and particularly among young males, is a cause for concern.

Negative Effects of Alcohol and Drug Use

- The occurrences of alcohol-related negative effects (i.e., serious consequences, productivity loss, or dependence symptoms) were more common among E1-E3s than among other pay grade groups. Although rare overall, the occurrence of drug-related negative effects (i.e., serious consequences or productivity loss) was also more likely among E1-E3s.

- Drinking levels were positively related to alcohol-related serious consequences, with heavy drinkers being most likely to encounter alcohol-related serious consequences, followed by moderate/heavy drinkers.
- Drug use patterns were positively related to serious consequences. Users of drugs other than or in addition to marijuana reported significantly more drug-related serious consequences than did users of marijuana only.
- Heavy alcohol use and any drug use were both significantly associated with an increased number of general negative behaviors (not specifically attributed to alcohol or other drug use) for enlisted males and officers, but not for enlisted females. In addition, perceived work-related stress was a significant predictor of general negative behaviors for all three groups.

As indicated earlier, negative effects due to alcohol use and other drug use have declined significantly among military personnel since 1980. These declines are consistent with declines in alcohol and other drug use during this period. Personnel who are heavy drinkers place themselves at greater risk of having alcohol-related serious consequences than do personnel at other drinking levels. In addition, enlisted males and officers who drank heavily, used drugs, or experienced perceived job stress were significantly more likely to experience general negative consequences than were their counterparts. Interventions designed to reduce job stress may help to reduce the occurrence of general negative behaviors.

Selected Medical Costs of Alcohol and Cigarette Use Among Active Duty Personnel

For the first time in the Worldwide Survey series, we estimated selected costs attributable to heavy drinking and heavy smoking that are incurred by the military in the provision of selected medical services to active duty personnel. We estimated tangible medical costs (e.g., outpatient medical services delivered at a military facility) based on self-reported medical service utilization data from survey respondents. However, estimates of the potentially substantial costs associated with diminished productivity, increased absenteeism, educational costs, or property damage were beyond the scope of this effort. Further, we did not examine the costs of alcohol treatment.

- Logistic regression results indicated that heavy smokers were significantly more likely than personnel who were not heavy smokers to use services from a general practitioner at a military facility, after we controlled for the effects of sociodemographic factors such as sex and age that can affect medical service utilization.
- Heavy drinkers were significantly more likely to use outpatient civilian medical services than were other drinkers or abstainers.

[Cost estimates reported in the next three bullets are not total medical costs for the DoD].

- The estimated annual incremental cost imposed on DoD by the "excess" use of outpatient military physician services by active duty heavy smokers was \$2.8 million.
- The estimated annual incremental cost imposed on DoD by the "excess" use of outpatient civilian physician services by active duty heavy drinkers was \$1.4 million.
- The incremental costs of selected medical services due to "excess" use by active duty heavy drinkers and heavy smokers, \$4.2 million, was a fairly modest (0.3%) share of the total active duty medical costs incurred by DoD.

These rather modest estimates must be interpreted with caution, as total costs to DoD associated with heavy alcohol and cigarette use may still be substantial. This analysis examined only a very limited aspect of potential costs that may be associated with heavy drinking or heavy smoking. In particular, we did not examine costs due to increased absenteeism, diminished productivity, or property damage that might be attributable to alcohol use or careless use of cigarettes. In addition, our estimates were restricted to active duty personnel who were fit for duty and were based on respondents' reported use of services. Cost data were not included from other sources (e.g., hospital discharge summaries or outpatient encounter forms), or from other populations served by the military medical system (e.g., retirees or dependents who use a military facility) that are likely to show additional medical costs for DoD associated with heavy alcohol or cigarette use. However, the fact that we detected some increased medical costs attributable to heavy drinking and heavy smoking among the generally young and healthy active duty population indicates that these personnel were already beginning to experience some negative health consequences associated with their use of these substances.

Alcohol, Other Drug, and Tobacco Policies and Programs

- Personnel generally do not believe that drinking and drug use are broadly accepted norms in the military, indicating that the Services offer a climate supportive of reasoned use of alcohol and nonuse of drugs.
- Most military personnel had not received alcohol or other drug abuse treatment. Only 9.5% reported treatment for an alcohol problem and 1.4% for a drug problem.
- Military personnel perceived a number of barriers to seeking help for an alcohol problem, notably that (a) disciplinary action would result; (b) commanders would find out; and (c) one's military career would be damaged.

- Trust in the reliability of drug testing has also increased, with 50.7% in 1992 seeing tests as reliable, compared to 41.2% in 1988.

In sum, military policies and programs appear to be effective in creating an environment conducive to responsible alcohol use and nonuse of drugs. Personnel are generally aware of the health risks of alcohol and other drug use and are moderately aware of the potential effects on job performance and combat readiness. The urinalysis program appears to be an especially effective component of the drug abuse prevention program, but educational programs regarding the risks of alcohol and other drug use and effects on job performance may need to be intensified. Further attention may also need to be paid to any barriers to seeking help, either real or perceived.

Health Behavior and Health Promotion

- Approximately two thirds of all military personnel had their blood pressure checked in the past year, and 36.0% had their cholesterol checked. In comparison, the Healthy People 2000 objectives for blood pressure and cholesterol screening were for at least 90% of adults to have had their blood pressure checked in the past 2 years and be able to state whether it was normal or high, and for at least 75% of adults to have had their cholesterol checked in the past 5 years.
- Over half of personnel in the total DoD and in all four Services engaged in the past month in some form of strenuous physical activity at least 3 days per week for 20 minutes or more. Thus, the military is already greatly exceeding the Healthy People 2000 objective of at least 20% of adults engaging in vigorous physical activity 3 or more days per week for 20 minutes or more.
- The DoD and all four Services had already exceeded, or were very close to achieving, the Healthy People 2000 objective of 50% or more of unmarried individuals having used condoms during their last episode of sexual intercourse, with 50.2% of all unmarried military personnel in the total DoD having used a condom. However, condom use was less common among partners of female personnel and among older personnel.
- In the past year, approximately 10% of all military personnel were identified by a health professional as having high blood cholesterol; 7.9% were identified as having high blood pressure; 9.0% were identified as being overweight; and 12.0% were advised to change their eating habits. However, these are probably conservative estimates of the true prevalence of these problems in the military.
- Approximately 90% of personnel who were identified as having high blood pressure took some action to change their behavior. This percentage of personnel taking action to control their blood pressure matches the Healthy People 2000 objective for adults with high blood pressure taking action to control their blood pressure.

- Less than half of all smokers who were advised by a health professional to quit attempted to do so, and less than 5% succeeded. In comparison, over 50% of all smokers in the total DoD made a serious attempt to quit in the past year, and approximately 13% succeeded.
- Heavy alcohol use and smoking were moderately interrelated. Heavy drinkers were more likely to be smokers than smokers were to be heavy drinkers.

In sum, these findings indicate that DoD and the Services have already made considerable progress toward achieving selected Healthy People 2000 objectives related to health promotion and disease risk reduction. Taken together, these findings suggest that most military personnel enjoy good health and are willing to change their behavior if needed to improve their health. However, more effort may be needed to identify ways to improve the success rate among smokers who try to quit, as well as to encourage smokers to try to quit again, if they had not succeeded in earlier attempts to quit.

Knowledge and Beliefs About AIDS

- The vast majority of military personnel know that HIV (the virus that causes AIDS) can be transmitted through sexual contact or by sharing needles. Most personnel knew the difference between HIV infection and AIDS (88.4%) and knew that an infected person could still look and feel healthy (92.3%).
- Less than half (42.5%) knew that there was a difference in effectiveness between natural-membrane and latex condoms in preventing HIV transmission.
- Sizable percentages incorrectly believed that HIV can be transmitted by nonpersonal contact such as sharing eating utensils with an infected person.
- In general, levels of knowledge about AIDS and beliefs about HIV transmission were comparable between military personnel and civilians. However, a higher percentage of military personnel than civilians correctly knew that natural-membrane condoms and latex condoms are not equally effective in preventing transmission of HIV.

In sum, most personnel were aware of the means through which HIV can definitely be transmitted, including through sexual contact. However, most personnel were not aware of differences between latex and natural-membrane condoms in preventing the spread of HIV. In addition, sizable percentages of personnel still held misconceptions about transmission of HIV through casual contact. These latter findings indicate the need to continue and to intensify military educational efforts about AIDS.

Special Issues

We examined two additional special issues as part of the 1992 Worldwide Survey:

- (a) the impact that Operation Desert Shield/Desert Storm had on substance use; and
- (b) the prevalence of problem or pathological gambling in the military.

- An estimate of slightly more than 20% of all active duty military personnel served in Operation Desert Shield/Desert Storm. Approximately 30% of all Army personnel and over 40% of all Marine Corps personnel participated in the Operation.
- Most personnel who served in Operation Desert Shield/Desert Storm decreased their alcohol use during that period or else considered themselves to be nondrinkers. This change was probably due to the cultural prohibitions in the region against alcohol use.
- Nearly one fourth of all individuals serving in Operation Desert Shield/Desert Storm (22.7%) increased their smoking, resumed smoking, or started smoking for the first time during their period of service in the Middle East.
- Now that veterans of Operation Desert Shield/Desert Storm are no longer serving in the Middle East, their patterns of alcohol, other drug, and cigarette use resemble those of personnel who did not serve. Although some significant differences appeared to exist in the substance use patterns of personnel who served or did not serve in the Operation, these differences appeared to be due to sociodemographic differences rather than to service in Desert Shield/Desert Storm.
- For the total DoD, 2.0% of personnel could be classified as probable pathological gamblers, and an additional 5.2% of personnel could be classified as potential problem gamblers.
- Approximately 5% of all military personnel who have been treated for alcohol problems since entering the military could be classified as probable pathological gamblers. In addition, the prevalence of pathological gambling among personnel showing symptoms of alcohol dependence was over 10%, regardless of whether they had ever received treatment.

Table 4.4 Significant Odds Ratios for Predicting Heavy Drinking Among Enlisted Males (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI Lower Limit	95% CI Upper Limit
Service			
Army vs. Air Force	1.33*	1.05	1.69
Marine Corps vs. Air Force	1.32*	1.08	1.61
Race/Ethnicity			
Black vs. white	0.58***	0.43	0.77
Other vs. white	0.62**	0.44	0.86
Education			
High school or less vs. beyond high school	1.42***	1.17	1.73
Family Status			
Single vs. married, spouse present	1.79***	1.42	2.25
Married, spouse not present vs. married, spouse present	1.84*	1.16	2.93
Occupation			
Functional support vs. direct combat	0.67*	0.47	0.96
Health Practices	0.87**	0.79	0.95
Drinking Mood Alteration Index	1.82***	1.52	2.20
Drink to Get Drunk	1.65***	1.50	1.83
Times at Work I Could Use a Drink	1.21***	1.12	1.30

Note: Abstainers were excluded from the analysis. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*p < .05.

**p < .01.

***p < .001.

*95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 4.11 Standardized Comparisons of Drinking Levels Among Military Personnel and Civilians for Persons Ages 18-55

Sex/Drinking Level	Comparison Population			
	Civilian	Total DoD	Army	Navy Marine Corps Air Force
Males	<u>N</u> =8,814	<u>N</u> =10,224	<u>N</u> =3,107	<u>N</u> =2,321 <u>N</u> =1,636 <u>N</u> =3,160
Abstainer	32.0 (1.0)	19.7 (0.7)*	21.1 (1.6)*	19.0 (1.7)* 15.0 (0.8)* 21.0 (0.9)*
Infrequent/Light-	57.5 (1.0)	64.1 (0.9)*	60.2 (1.8)*	66.4 (1.7)* 59.2 (1.9) 68.1 (1.4)*
Moderate/Heavy	10.5 (0.7)	16.2 (0.8)*	18.7 (1.7)*	14.5 (1.0)* 25.9 (1.6)* 10.9 (1.1)
Females	<u>N</u> =11,981	<u>N</u> =1,264	<u>N</u> =316	<u>N</u> =390 <u>N</u> =80 <u>N</u> =478
Abstainer	46.6 (0.9)	32.0 (1.7)*	42.3 (3.0)	28.1 (2.7)* 16.1 (5.7)* 31.4 (3.0)*
Infrequent/Light-	49.8 (0.9)	63.7 (2.0)*	54.3 (3.1)	67.5 (3.1)* 63.9 (3.4)*
Moderate/Heavy	3.5 (0.3)	4.3 (0.8)	3.4 (1.5)	4.4 (1.3) 4.7 (1.3)
Total	<u>N</u> =20,795	<u>N</u> =11,488	<u>N</u> =3,423	<u>N</u> =2,711 <u>N</u> =1,716 <u>N</u> =3,638
Abstainer	34.2 (0.9)	21.5 (0.8)*	23.7 (1.7)*	20.9 (1.9)* 15.0 (0.7)* 22.5 (1.1)*
Infrequent/Light-	56.4 (0.9)	64.0 (0.8)*	59.5 (1.7)	66.7 (1.4)* 59.8 (1.5) 67.4 (1.6)*
Moderate/Heavy	9.5 (0.6)	14.5 (0.8)*	16.8 (1.8)*	12.4 (1.0)* 25.2 (1.5)* 10.0 (1.0)

Note: Table entries are percentages (with standard errors in parentheses). Civilian data have been standardized to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Estimates have not been adjusted for sociodemographic differences among Services.

*Significantly different from civilian at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.

Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 4.5 Significant Odds Ratios for Predicting Heavy Drinking Among Enlisted Females (Full Logistic Regression Model)

Item/Comparison	Odds Ratio	95% CI ^a Lower Limit	95% CI Upper Limit
Race/Ethnicity Black vs. white	0.26*	0.09	0.79
Family Status Single vs. married, spouse present	3.24*	1.37	7.67
Region North Pacific vs. Europe	2.14*	1.11	4.11
Occupation Craftsman vs. service & supply	20.76***	4.35	98.97
Drinking Mood Alteration Index	4.27*	1.07	17.09
Drink to Get Drunk	1.94*	1.11	3.37
Times at Work I Could Use a Drink	1.41*	1.07	1.84

Note: Abstainers were excluded from the analysis. Occupational groups for these estimates are based on a self-reported functional job classification (in which personnel specified their military job) rather than a formal job classification based on official occupational specialties/ratings (see Table 2.5 for the distribution of occupations).

*p < .05.

**p < .01.

***p < .001.

^a95% CI = 95% confidence interval for the odds ratio.

Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 4.12 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians for Persons Ages 18-55

Sex/Age Group	Comparison Population			
	Civilian	Total DoD	Army	Navy Marine Corps Air Force
Males	N=8,814	N=10,224	N=3,107	N=2,321 N=1,636 N=3,160
18-25	13.8 (1.3)	25.9 (1.6)*	30.3 (2.7)*	22.1 (2.4)* 34.8 (3.2)* 16.9 (2.2)
26-55	8.5 (0.7)	10.5 (0.6)*	12.0 (1.5)*	9.9 (0.7) 14.3 (2.1)* 8.5 (1.3)
All ages	10.5 (0.7)	16.2 (0.8)*	18.7 (1.7)*	14.5 (1.0)* 25.9 (1.6)* 10.9 (1.1)
Females	N=11,981	N=1,264	N=316	N=390 N=80 N=478
18-25	5.2 (0.5)	5.1 (1.8)	3.9 (2.3)	3.6 (2.2) + (2.2)* 9.8 (2.2)*
26-55	2.0 (0.2)	3.5 (1.0)	3.1 (1.9)	5.4 (1.9) ** (**) 1.6 (0.9)
All ages	3.5 (0.3)	4.3 (0.8)	3.4 (1.5)	4.4 (1.3) + (1.3) 4.7 (1.3)
Total	N=20,795	N=11,488	N=3,423	N=2,711 N=1,716 N=3,638
18-25	12.2 (1.1)	22.1 (1.8)*	26.8 (2.9)*	16.9 (2.6) 33.9 (3.0)* 15.6 (1.8)
26-55	7.7 (0.6)	9.6 (0.6)*	11.0 (1.4)*	9.2 (0.7) 13.8 (2.0)* 7.6 (1.1)
All ages	9.5 (0.6)	14.5 (0.8)*	16.8 (1.8)*	12.4 (1.0)* 25.2 (1.5)* 10.0 (1.0)

Note: Table entries are percentages (with standard errors in parentheses). Civilian data have been standardized to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Estimates have not been adjusted for sociodemographic differences among Services.

**Estimate rounds to zero.

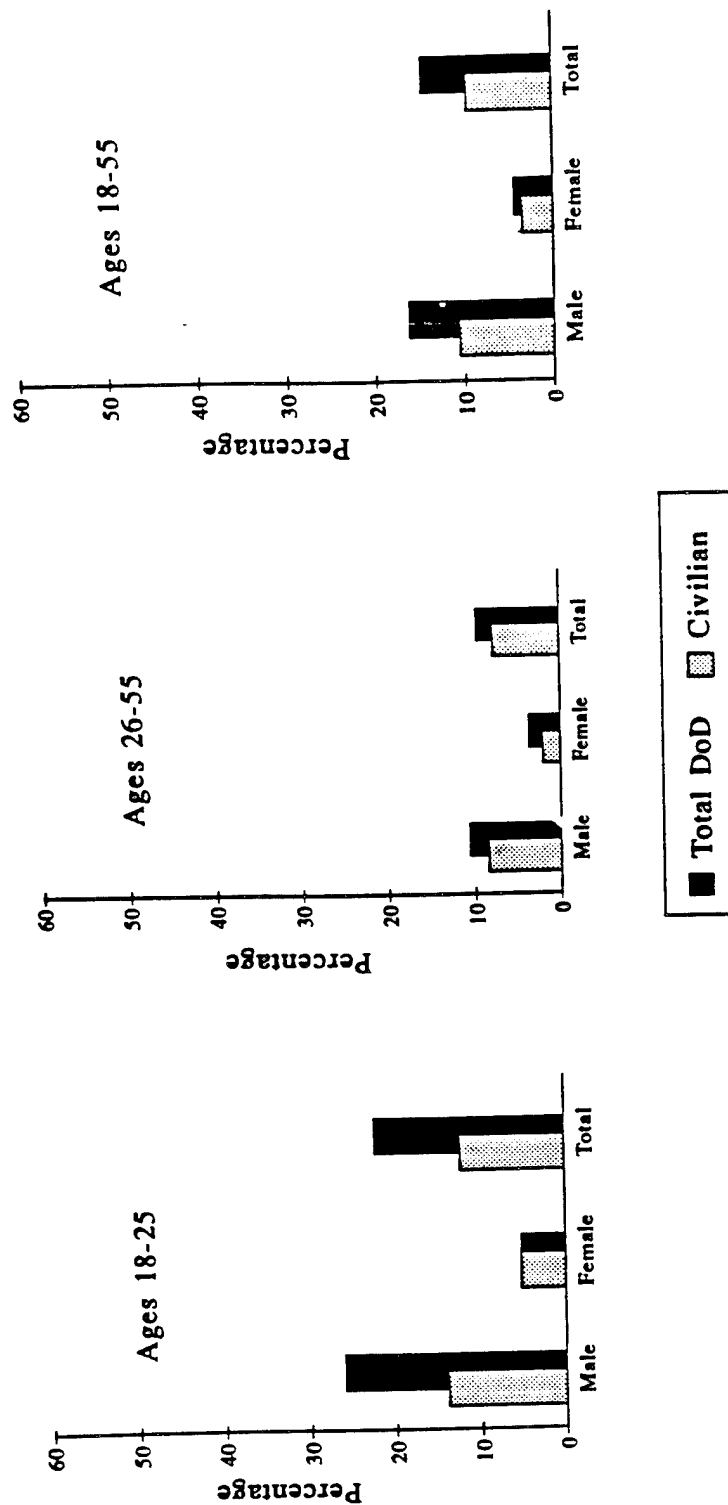
+Unreliable estimate.

*Significantly different from civilian at the .05 level.

Civilian data source: 1991 National Household Survey on Drug Abuse.

Military data source: 1992 Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel.

Figure 4.6 Standardized Comparisons of the Prevalence of Heavy Drinking Among Military Personnel and Civilians, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
 Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 5.8 Standardized Comparisons of the Prevalence of Any Illicit Drug Use* Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Age Group	Comparison Population			
	Civilian	Total DoD	Army	Navy Marine Corps Air Force
Males	N=8,977	N=10,210	N=3,098	N=2,320
18-25	15.4 (1.1) ^b	6.9 (1.2) ^b	8.1 (2.2) ^b	7.9 (2.9) ^b
26-55	6.9 (0.4)	1.7 (0.3) ^b	2.2 (0.6) ^b	1.7 (0.7) ^b
All ages	10.1 (0.5)	3.6 (0.5) ^b	4.4 (1.1) ^b	4.1 (1.2) ^b
Females	N=12,176	N=1,265	N=317	N=80
18-25	12.2 (0.8)	2.7 (1.6) ^b	+ (+)	+ (+)
26-55	4.8 (0.5)	1.5 (0.5) ^b	2.2 (1.1) ^b	** (**)
All ages	8.3 (0.4)	2.1 (0.8) ^b	2.3 (1.1) ^b	+ (+)
Total	N=21,153	N=11,475	N=3,415	N=2,710
18-25	14.8 (0.9)	6.2 (1.2) ^b	7.3 (2.2) ^b	6.6 (2.7) ^b
26-55	6.7 (0.4)	1.6 (0.3) ^b	2.3 (0.5) ^b	1.7 (0.6) ^b
All ages	9.8 (0.4)	3.4 (0.5) ^b	4.1 (1.0) ^b	3.8 (1.1) ^b
				N=1,714
				N=3,636
				1.2 (0.4) ^b
				1.2 (0.3) ^b
				1.2 (0.2) ^b

Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the military data by age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

**Estimate rounds to zero.

+ Unreliable estimate.

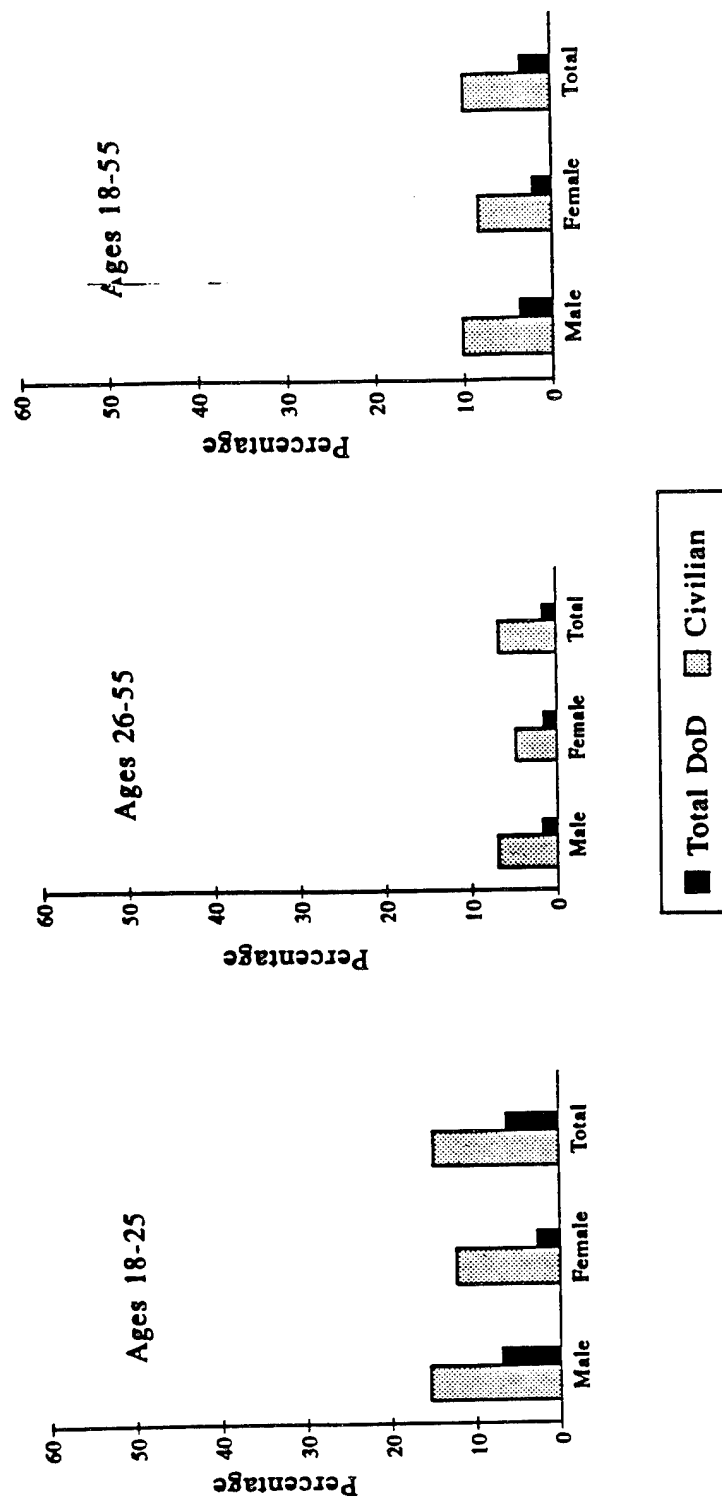
^aNonmedical use one or more times of marijuana or hashish, inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, tranquilizers, analgesics, or "designer" drugs.

^bSignificantly different from civilian at the .05 level.

Civilian data source: National Household Survey on Drug Abuse, 1991.

Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 5.7 Standardized Comparisons of Any Illicit Drug Use Among Military Personnel and Civilians, Past 30 Days, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.

Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 6.12 Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Age Group	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,977	N=10,201	N=3,097	N=2,312	N=1,635	N=3,157
18-25	33.3 (1.7)	38.3 (1.6)*	39.1 (2.4)	40.2 (2.8)*	41.5 (4.1)	31.5 (2.5)
26-55	29.4 (1.0)	32.9 (1.3)*	36.3 (2.9)*	35.4 (2.5)*	36.3 (3.4)	26.2 (1.7)
All ages	30.8 (1.0)	34.9 (1.2)*	37.3 (2.6)*	37.2 (2.3)*	39.2 (2.9)*	27.7 (1.6)
Females	N=12,176	N=1,262	N=317	N=389	N=80	N=476
18-25	29.3 (1.2)	31.6 (3.0)	30.9 (5.3)	32.7 (4.5)	+	25.3 (4.4)
26-55	27.3 (1.1)	30.4 (2.1)	29.1 (4.7)	36.6 (2.7)*	+	23.9 (3.3)
All ages	28.2 (0.8)	31.0 (2.1)	29.8 (4.6)	34.3 (2.9)*	+	24.5 (2.5)
Total	N=21,153	N=11,463	N=3,414	N=2,701	N=1,715	N=3,633
18-25	32.6 (1.4)	37.1 (1.4)*	38.0 (2.5)	38.1 (2.3)*	42.1(3.7)*	30.3 (2.2)
26-55	29.1 (0.9)	32.6 (1.2)*	35.5 (2.8)*	35.5 (2.1)*	36.3(3.4)*	25.9 (1.6)
All ages	30.4 (0.9)	34.3 (1.2)*	36.4 (2.5)*	36.6 (2.0)*	39.6(2.7)*	27.2 (1.4)

Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

*Significantly different from civilian at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.

Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Table 6.13 Standardized Comparisons of Cigarette Smoking Levels Among Military Personnel and Civilians, Past 30 Days, for Persons Ages 18-55

Sex/ Cigarette Use	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males	N=8,884	N=10,182	N=3,088	N=2,307	N=1,631	N=3,156
Nonsmoker	69.6 (1.0)	65.3 (1.2)*	62.9 (2.6)*	63.1 (2.1)*	61.0 (2.8)*	72.3 (1.6)
< 1 pack/day	13.7 (0.7)	18.6 (0.7)*	19.1 (1.5)*	20.1 (1.0)*	21.8 (2.1)*	15.0 (1.2)
≥ 1 pack/day	16.6 (0.7)	16.1 (0.7)	18.0 (1.9)	16.7 (1.3)	17.2 (1.0)	12.6 (0.8)*
Females	N=12,073	N=1,261	N=316	N=389	N=80	N=476
Nonsmoker	72.4 (0.9)	69.0 (2.1)	70.2 (4.6)	65.7 (2.9)*	+ (+)	75.5 (2.5)
< 1 pack/day	15.6 (0.7)	13.5 (1.4)	9.3 (1.9)*	18.4 (1.6)	+ (+)	7.5 (2.1)*
≥ 1 pack/day	12.1 (0.7)	17.5 (1.2)*	20.4 (3.5)*	15.9 (1.9)	+ (+)	16.9 (2.0)*
Total	N=20,957	N=11,443	N=3,404	N=2,696	N=1,711	N=3,632
Nonsmoker	70.0 (0.9)	65.8 (1.1)*	63.8 (2.5)*	63.7 (1.9)*	60.6 (2.6)*	72.8 (1.4)
< 1 pack/day	14.0 (0.6)	17.9 (0.6)*	17.9 (1.3)*	19.8 (0.7)*	22.0 (1.9)*	14.0 (1.2)
≥ 1 pack/day	16.0 (0.6)	16.3 (0.7)	18.3 (1.8)	16.6 (1.3)	17.4 (1.0)	13.2 (0.7)*

Note: Table entries are percentages with standard errors in parentheses. Civilian data have been standardized to the U.S.-based DoD data by sex, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). N's show the number of cases on which the weighted estimates are based. Significance tests were conducted between military and civilian populations only. Only those differences that were statistically significant are indicated.

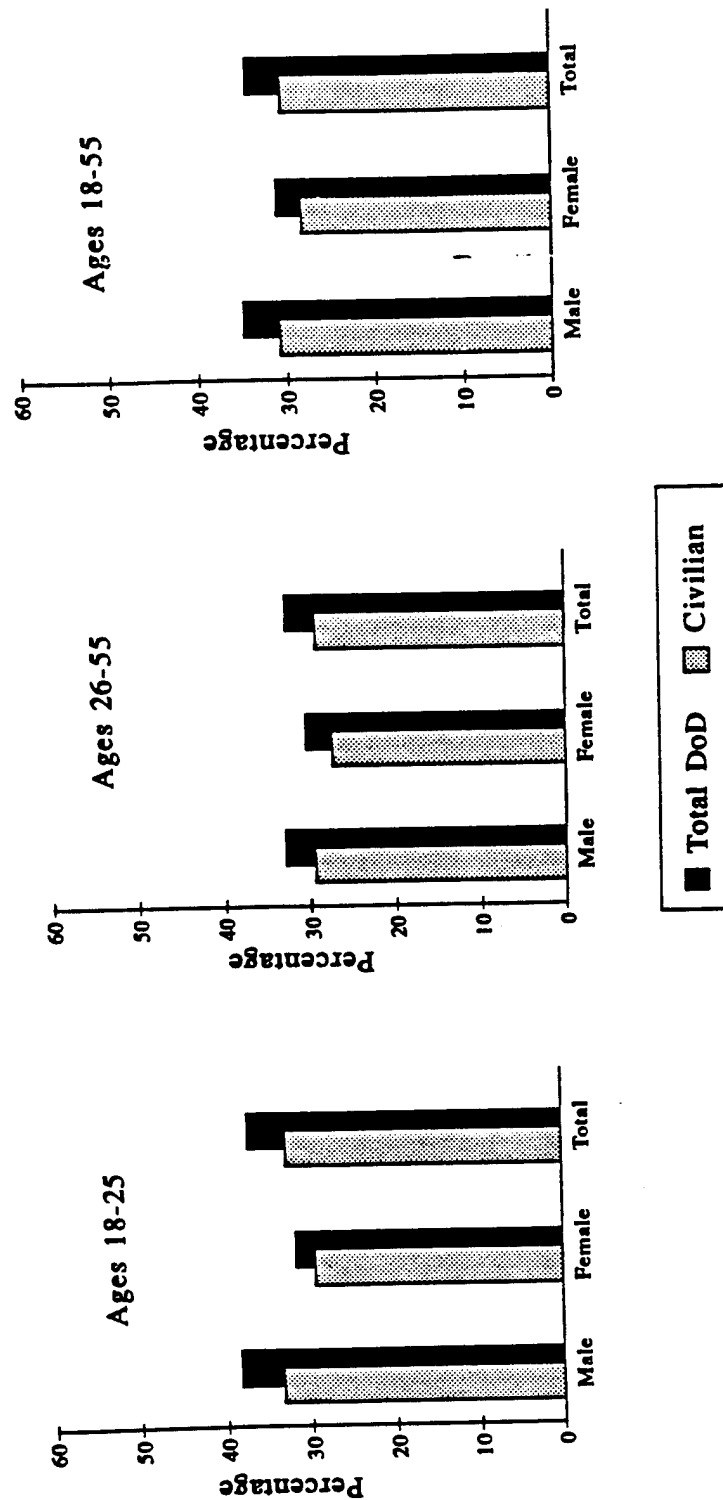
*Significantly different from civilian at the .05 level.

+Unreliable estimate.

Civilian data source: National Household Survey on Drug Abuse, 1991.

Military data source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

Figure 6.9 Standardized Comparisons of Any Cigarette Smoking Among Military Personnel and Civilians, Past 30 Days, by Age and Sex



Note: Military data are for the U.S.-based DoD and include personnel in Alaska and Hawaii. Civilian data have been standardized to the military data by sex, age, education, race/ethnicity, and marital status.

Civilian Data Source: National Household Survey on Drug Abuse, 1991.
 Military Data Source: Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel, 1992.

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Neuroendocrine Activation in Women

ANDRINE M. LEMIEUX, MA, AND CHRISTOPHER L. COE, PhD

The following study tested the hypothesis that women with post-traumatic stress disorder (PTSD) related to childhood sexual abuse would display elevated norepinephrine-to-cortisol ratios similar to that found in male combat veterans diagnosed with PTSD. Twenty-four-hour urine samples were collected from 28 women: 11 women with PTSD who experienced childhood sexual abuse (PTSD+), 8 women who experienced childhood sexual abuse without PTSD (PTSD-), and 9 nonabused controls. All urine samples were tested for creatinine, total catecholamines, free-cortisol, and 17-ketosteroid levels. Psychological testing validated that the PTSD+ group was significantly elevated on all three subscales of the Impact of Events Scale. Both abused groups (PTSD+ and PTSD-) showed a tendency for polyuria, and the PTSD+ group showed a tendency towards obesity. Thus, neuroendocrine values ($\mu\text{g/day}$) were adjusted by creatinine clearance rates (creatinine mg/day/kg body weight). The corrected values indicated that the PTSD+ group had significantly elevated daily levels of norepinephrine, epinephrine, dopamine, and cortisol. However, because of the parallel elevation in cortisol, the norepinephrine-to-cortisol ratio was not significantly elevated in the PTSD+ diagnosed women in contrast to the findings reported for male PTSD patients. This discrepancy may reflect an important gender difference, an interaction between gender and age at onset of the traumatic experience (childhood abuse in females vs. combat experience in young adult males), or physiological variation related to phase of the disorder.

Key words: Childhood sexual abuse, post-traumatic stress disorder, neuroendocrine, cortisol, catecholamines, urine

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Seeking Medical Care in Response to Symptoms and Life Stress¹

LINDA CAMERON, ELAINE A. LEVENTHAL, AND HOWARD LEVENTHAL, PhD

Analyses tested the following contrasting hypotheses: a) The occurrence of a new symptom in the presence of ongoing life stress increases the attribution of symptoms to illness and increases the use of health care; b) new symptoms occurring in the presence of ongoing life stress are attributed to stressors if they are ambiguous indicators of illness, and they are unlikely to motivate care-seeking if the stressor, i.e., the perceived cause, is of recent onset. The 43-to-92-year old subjects in this longitudinal study were less likely to seek care for the ambiguous symptoms they experienced during the previous week if there was a concurrent life stressor that began during the previous 3 weeks; these symptoms were attributed to stress rather than to illness, and subjects tolerated the emotional distress caused by the combination of a stressor and an ambiguous symptom. Subjects were less willing to tolerate the combined distress of an ambiguous symptom and a concurrent life stressor if the stressor onset was not recent; under such conditions, subjects were more likely to seek health care. Current life stressors did not affect care-seeking for symptoms that were clear signs of disease; these symptoms were readily identified as health threats in need of medical attention. The findings contribute to a better theoretical understanding of how individuals perceive their physical states and how they cope with stress. Practical implications of these findings for increasing efficient use of health care services are also discussed.

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Sex-Specific Effects of Social Support on Cortisol and Subjective Responses to Acute Psychological Stress

CLEMENS KIRSCHBAUM, PhD, THOMAS KLAUER, PhD, SIGRUN-HEIDE FILIPP, PhD,
AND DIRK HELMUT HELHAMMER, PhD

The effects of short-term social support on cortisol levels and subjective responses to acute psychological stress were investigated in healthy adults (total $N = 66$). In anticipation of a public-speaking task in front of an audience, subjects received either no social support ("no support") or social support from an opposite-sex stranger ("stranger") or from their boyfriend or girlfriend ("partner"). Support providers were instructed to enact both instrumental and emotional support during the 10-minute anticipation period. The results obtained suggest sex-specific effects of social support. Although men in the partner support condition showed significant attenuation of cortisol responses compared with unsupported and stranger-supported men, women showed no response decrement under stranger support. In contrast to men, women showed a tendency toward increased cortisol responses when supported by their boyfriends. The endocrine response differences between male and female subjects were unrelated to questionnaire-derived psychological variables. No sex and group differences in perceived stress, mood changes, or social desirability were observed. Although the overall level of subjective well-being throughout the experiment was elevated in the partner support condition, no sex or group differences were observed in perceived stress, well-being changes, and social desirability. Opposite to their cortisol responses, women rated both stranger and partner support attempts more favorably than did men. No significant correlations were observed between the perceived stressfulness of the situation, mood changes, and cortisol responses. These results provide preliminary evidence for sex-specific patterns of social support efficacy to acute psychological stress with respect to adrenocortical responses.

Key words: HPA axis, psychological stress, saliva cortisol, sex roles, social support.

Affiliation Moderates the Effects of Social Threat on Stress-Related Cardiovascular Responses: Boundary Conditions for a Laboratory Model of Social Support

THOMAS W. KAMARCK, PhD, BARBARA ANNUNZIATO, BA, AND LEIGH MERIWETHER AMATEAU, BA

The authors tested the hypothesis that the response-attenuating effects of affiliation under stress are limited to conditions that involve high social threat. Ninety-six young adult women were exposed to standardized psychological challenges in one of four conditions that involved two levels of social affiliation (alone or accompanied by a close friend) and two levels of social threat (variations in the social behavior and perceived status of the experimenter). Social affiliation was associated with attenuated blood pressure responses to the challenges but only under conditions of high social threat. Affiliation was not associated with differences in self-reported emotional response to the challenges nor with alterations in cognitive task appraisal. Exploratory analyses suggested that some of these effects were stronger in hostile or socially avoidant individuals. Implications of these findings for interpreting the literature on social support and cardiovascular reactivity, and for understanding the potential role of social support in reducing stress-related disease pathogenesis, are discussed.

Key words: Social support, cardiovascular reactivity, cardiovascular disease, cardiovascular psychophysiology.

INTRODUCTION

Accumulating evidence suggests that social relationships exert a significant influence on physical well-being. A number of large-scale prospective studies, for example, have shown socially integrated individuals to be at reduced risk for premature all-cause mortality (1). Recent studies of patients postmyocardial infarction have shown that ratings of social support or social network integration are independently associated with cardiac prognosis or survival, which suggests a specific role for social support in the setting of cardiovascular disease (2-5), and one recent report suggests that social support measures may also be associated with cardiovascular disease incidence (6). The mechanisms by which social relationships affect health have not yet been established (7). Existing evidence (1), however, suggests that these associations cannot be accounted for on the basis of established risk factors or health behaviors alone. Prolonged or exaggerated autonomic responses associated with stress have been proposed to play a role in the development of a number of cardiovascular disease processes (8-10).

If social support could be shown to modulate cardiovascular reactivity during psychological challenge, this might explain, in part, its association with health outcomes.

We have previously shown that the presence of an affiliative companion is associated with reductions in cardiovascular responses to psychological challenge (11). In our initial investigation of this topic, we asked female subjects to attend a laboratory session alone or accompanied by a close friend. All subjects were exposed to a Mental Arithmetic and a Concept Formation task. Subjects in the accompanied condition showed smaller task-related changes in systolic blood pressure and heart rate during the challenges compared with unaccompanied subjects, and there were no condition differences in self-reported emotional response during task exposure.

Recent laboratory investigations have continued to explore this "affiliation effect" under a variety of experimental conditions (12-17). In each of these studies, subjects have been exposed to standardized cognitive or interpersonal challenges, with or without an affiliative companion. Two of these studies have substantially replicated the findings described above (13, 14). In the four remaining reports, affiliation has not been consistently associated with reduced stressor-related cardiovascular activity (12, 15-17). Variations in experimental procedures may alter the strength or significance of the "affiliation effect." The existence of such boundary conditions for this phenomenon in the laboratory may assist us in understanding the mechanisms by which social

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support might alter cardiovascular reactivity during the course of daily living.

One means by which the social context may modify psychophysiological responses, according to Cacioppo et al. (18, 19), is through altering the perceived potential for punitive consequences (e.g., withdrawal of social approval) during ongoing behavior. Aversive social contingencies, in this manner, may alter cardiovascular responsiveness in the same manner that nonsocial performance incentives modify cardiovascular responses to psychological challenge (20). In the literature reviewed here, one of the differences between studies that have shown clear affiliation effects, and those that have not, may lie in the salience of these potentially punitive consequences, or "social threats," associated with each.

In each of the three studies that report response-reducing effects of affiliation, the experimenter emphasized the social contingencies associated with subject performance. In our initial investigation (11), for example, the experimenter provided subjects with standardized prompts during the task, emphasizing performance standards. A public speaking task was used by Lepore et al. (14) to promote cardiovascular activation; the evaluative dimension of this task was enhanced by requiring subjects to face a one-way mirror through which they expected to be observed and recorded. Gerin et al. (13) asked subjects to discuss a controversial topic (e.g., abortion) with two confederates who adopted an opposing point of view; they described the social context in this study as one "in which the subject could be challenged and attacked (p. 326)."

In contrast, the studies that show no affiliation effects involved experimenter-subject interactions that appeared to be less punitive in nature. Sheffield and Carroll (17) examined the effects of partner presence (friend or stranger vs. alone) on cardiovascular responses to two cognitive challenges and found no significant condition effects. There was no explicit manipulation of social threat noted in this study. Snydersmith and Cacioppo (16) showed no significant effects of friend presence on heart rate or skin conductance response to two laboratory tasks. In this study, the manipulation was explicitly designed to reduce rather than to enhance the obtrusiveness of the experimenter. Edens et al. (12) examined the effects of friend and stranger presence on cardiovascular responses to two laboratory tasks. Although the experimental instructions for one of the tasks appeared to be similar to those used in our initial investigation, the responses to the task were much smaller, even in the unaccompanied condi-

tions, a fact attributed by the investigators to the presence of a more informal laboratory social climate.

Differences that involved the social threat value of the affiliative partner may also contribute to inconsistent findings in this literature. Three recent studies have shown *enhanced* rather than reduced task-related autonomic responses in the presence of a partner (14-16). These three studies differed with respect to whether the enhanced response condition involved a friend or stranger, but each included two characteristics: a) in each case, the companion was capable of observing task performance; and b) the companion provided no verbal feedback to the subject during task performance. Studies that show reduced cardiovascular responsiveness with affiliation, on the other hand, have included conditions designed to reduce evaluation potential (11) or have instructed companions to administer explicit facilitative verbal feedback (13, 14). Performers may appraise observers as potential sources of "threat" in novel settings until benign behavioral intentions can be explicitly established. Reviews of the social facilitation literature, for example, identify the unpredictability and the evaluation potential of observers as sources of performance disruption during laboratory tasks (21, 22).

This analysis of the boundary conditions for laboratory models of social support provides a clue as to some of the mechanisms by which affiliation may reduce cardiovascular reactivity. "Social threats" are hypothesized to increase cardiovascular reactivity through increasing the incentives for active behavioral responding (behaviors designed to avoid or reduce aversive control). "Socially supportive" interactions, on the other hand, may carry information that reduces the salience of concurrent social threats; it may be through this mechanism that social support reduces cardiovascular reactivity. The presence of a nonevaluative affiliative partner, according to this model, may have an ameliorative effect on psychophysiological reactivity only under conditions of high social threat. The present laboratory study was designed to test this hypothesis.

In a 2×2 factorial design, social threat (high vs. low experimenter status and evaluation potential) and social support (presence vs. absence of a nonevaluative affiliative partner) were manipulated before the presentation of a standardized psychological challenge in the laboratory. As in our initial investigation, we expected to show reductions in cardiovascular responsiveness in the presence of a nonevaluative partner during the stressor, but in this case.

AFFILIATION, SOCIAL THREAT, AND REACTIVITY

such effects were anticipated only under conditions of high social threat.

Four additional hypotheses were based on previous findings with this laboratory model. First, we previously reported some evidence that the effects of affiliation on reducing stress-related cardiovascular responding may persist in the same setting after the companion's departure (11); this finding was further explored in the present study. Second, previous studies of affiliation and reactivity have all used tasks that require verbal output or social interaction. The use of a nonverbal task that involves minimal motor movement, while artificial, allows us to rule out the possibility that affiliation may simply be associated with reduced gross motor movement, which allows us to examine more subtle, rudimentary processes that may account for these effects.

Third, previous results suggest that self-reported emotional response to challenge are not significantly affected by affiliation, although directional effects are shown in some studies (13, 14). Measures of momentary mood and cognitive task appraisal administered here will permit us to examine these effects further. Finally, we earlier reported that the effects of affiliation on response reduction were modified by the subjects' prevailing behavioral style (11); additional exploratory evidence relevant to this issue is examined here.

METHODS

Subjects

The subjects were 96 healthy women (age range, 18–30 years; mean, 20) recruited by poster and newspaper advertisement on campus at a metropolitan university and in the surrounding community (84% white, 12% black, and 4% other; 97% students). Female subjects were used to maximize the similarity with our initial study design (18). Based on evidence that menstrual phase may alter cardiovascular reactivity, equal numbers of subjects were scheduled during the luteal and follicular phase of the menstrual cycle within each condition, as assessed by self-report (23).

During an initial phone contact, smokers ($N = 53$) were excluded, as were those who were receiving medications with autonomic or cardiovascular effects ($N = 5$) and those with chronic medical conditions ($N = 6$). Volunteers were also excluded if they reported irregular cycle lengths ($N = 83$) or were receiving oral contraceptives ($N = 145$).

Each eligible subject was asked to recruit a "close friend" of the same sex, someone known for at least 2 months and with whom the subject felt comfortable sharing personal concerns. Subjects were recontacted several days after the initial contact to confirm that the companion had been recruited; at this time, they were invited either to bring the recruited friend to the laboratory session or to attend alone, depending on their condition assignment (see later). Subjects were required to refrain from consuming alcohol for 24 hours and from eating, exercise, and caffeine for 2 hours before the study. At the end of the study, subjects and

companions were reimbursed with class credit or payment (\$10 for each subject and \$5 for each companion who was asked to appear).

Data from six subjects were dropped after collection because of technical difficulties with task administration ($N = 1$), previous acquaintance with experimenter ($N = 2$), inappropriate task completion ($N = 1$), or previously unreported medication use ($N = 1$). Each of these subjects was replaced with another subject assigned to the same condition.

Measures of Laboratory Tasks

Stroop color-word task. This is a modified version of a widely used perceptual interference task. On each trial, subjects were presented with a color-word displayed on a video monitor; they were instructed to identify the color of the letter display (usually different from that of the written colored word) by using a four-button response key. A recording of random color names was presented as an additional distractor.

Instructions and examples were administered by the experimenter. Subjects were required to demonstrate proficiency after instructions (three of five practice trials correct) before task presentation. Task difficulty (speed of presentation) was adjusted commensurate with performance to ensure that the task was moderately difficult (about 65% accuracy) for all subjects. The task duration was 6 minutes.

Mental arithmetic task. By recorded instruction, subjects were required to perform serial subtraction by 17s aloud, from each of three four-digit numbers; a new four-digit number was introduced at the beginning of three consecutive 1-minute intervals. The task duration was 3 minutes. For both tasks, subjects were told to work as quickly as possible, with speed and accuracy as the criteria for evaluating performance.

Measures of Cardiovascular Activity

Cardiovascular activity was monitored at 90-second intervals throughout the session, using a Dinamap vital signs monitor (model 8100; Critikon (Johnson & Johnson), Tampa, FL). This device provides estimates of mean arterial pressure (not reported here), systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR) using oscillometry.

Measures of Mood, Personality, and Friendship Patterns

To reduce social desirability considerations, subjects in all conditions were alone during completion of the following instruments.

State-Trait Personality Inventory (STPI) state form. Before and after each of the psychological challenges, subjects completed the State form of the STPI (24), which assesses levels of anger, anxiety, and curiosity at the "current" time (pretask version) or "while performing the task" (23). The pretask questionnaire was administered in each case before the task instructions, and the posttask questionnaire was administered immediately after task completion.

Cognitive appraisal scales. Immediately after the instructions for each challenge, subjects were administered an experimental six-item scale to assess their cognitive appraisal of the upcoming task. This scale included three four-point Likert items that as-

DEMOGRAPHIC DATA

Data prepared by the DEFENSE MANPOWER DATA CENTER

1600 Wilson Boulevard, Suite 400
Arlington, Virginia 22209
Tel. 703-696-5823

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|--------|---|---|
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| | * | FEMALE ACTIVE DUTY BY EDUCATION |

FEMALE ACTIVE DUTY BY AGE 9502

AGE	ARMY	NAVY	M.C.	A.F.	TOTAL	MISC.	BLANK
17	30	57	10	35	132	0	0
18	1496	2025	453	1429	5403	0	0
19	3463	4032	786	3007	11290	0	0
20	4365	4375	845	3929	13514	0	0
21	4553	3799	773	4007	13132	0	0
22	4820	3269	615	3956	12660	0	0
23	5097	3076	539	4177	12889	0	0
24	4793	3036	487	4007	12323	0	0
25	4057	2627	346	3381	10411	0	0
26	3420	2203	297	3126	9046	0	0
27	3009	2074	268	2937	8288	0	0
28	2828	1964	245	2715	7757	0	0
29	2718	1809	221	2556	7304	0	0
30	2678	1830	204	2377	7089	0	0
31	2510	1783	209	2334	6836	0	0
32	2368	1818	188	2255	6629	0	0
33	2166	1788	197	2139	6290	0	0
34	2139	1498	151	2066	5854	0	0
35	1964	1436	151	2038	5589	0	0
36	1786	1319	155	1837	5097	0	0
37	1641	1207	148	1816	4812	0	0
38	1477	1064	102	1666	4309	0	0
39	1214	881	82	1476	3653	0	0
40	1027	765	76	1255	3123	0	0
41	873	700	56	1043	2672	0	0
42	706	539	37	845	2127	0	0
43	507	418	24	620	1569	0	0
44	438	312	29	485	1264	0	0
45	315	200	15	350	880	0	0
46	264	167	24	226	681	0	0
47	229	140	7	167	538	0	0
48	172	89	6	124	391	0	0
49	127	39	5	68	239	0	0
50	70	27	0	40	137	0	0
51	85	25	1	35	146	0	0
52	56	19	0	17	92	0	0
53	40	13	0	13	66	0	0
54	16	16	0	11	43	0	0
55	10	19	0	14	43	0	0
56	9	4	0	5	18	0	0
57	2	4	0	4	10	0	0
58	3	3	1	4	11	0	0
59	3	4	0	7	14	0	0
60	2	0	0	2	4	0	0
61	0	0	0	1	1	0	0
63	2	0	0	1	3	0	0
65	0	2	0	0	2	0	0
TOTAL	69548	52475	7753	64575	194371	0	0
MISC.	106	8	39	32	185	0	0

TOTAL FEMALE ACTIVE DUTY BY RACE FTHMIC 9502

RETH	ARMY	NAVY	M.C.	A.F.	TOTAL	MISC.	BLANK
1	32238	32924	4678	45763	115603	0	0
2	30391	13356	1923	13930	59600	0	0
3	2894	3930	802	2305	9931	0	0
4	542	423	119	434	1518	0	0
5	1722	1580	148	1400	4850	0	0
6	1855	179	122	779	2935	0	0
TOTAL	69642	52392	7792	64670	194466	0	0
MISC.	12	91	0	7	110	0	0

1 = WHITE

2 = BLACK

3 = HISPANIC

4 = AMERICAN INDIAN / ALASKAN NATIVE

5 = ASIAN / PACIFIC ISLANDER

6 = OTHER

FEMALES ACTIVE DUTY BY MS AND SERVICE 9502

SERVICE= TOTAL

DEPS	SINGLE	MARRIED	DIV	TOTAL	MISC.	BLANK
0	71184	31400	6091	108675	105	0
1	9378	28315	4869	42562	12	0
2	2316	18664	3055	24035	7	0
3	399	12544	872	13815	6	0
4	73	3807	180	4060	3	0
5	10	910	34	954	0	0
7	3	201	11	215	0	0
7	1	57	3	61	0	0
8*	2	21	2	25	0	0
TOTAL	83366	95919	15117	194402	133	0
MISC.	1	8	0	9	12	0

FEMALES ACTIVE DUTY BY MS AND SERVICE 9502

SERVICE= Army

DEPS	SINGLE	MARRIED	DIV	TOTAL	MISC.	BLANK
0	23710	9417	2527	35654	78	0
1	3081	10504	2338	16003	12	0
2	694	7492	1657	9843	7	0
3	137	5249	516	5902	6	0
4	24	1462	122	1608	3	0
5	5	363	23	391	0	0
6	1	88	6	95	0	0
7	0	22	2	24	0	0
8*	1	6	0	7	0	0
TOTAL	27653	34683	7191	69527	106	0
MISC.	1	8	1	9	12	0

FEMALES ACTIVE DUTY BY MS AND SERVICE 9502

SERVICE= A.F

DEPS	SINGLE	MARRIED	DIV	TOTAL	MISC.	BLANK
0	19839	13388	3287	36514	27	0
1	1601	10228	2303	14132	0	0
2	211	6348	1231	7790	0	0
3	27	4866	317	4410	0	0
4	6	1274	55	1335	0	0
5	1	310	9	320	0	0
6	1	64	5	70	0	0
7	0	21	1	22	0	0
8*	0	7	0	7	0	0
TOTAL	21686	35706	7208	64600	27	0

FEMALES ACTIVE DUTY BY MS AND SERVICE 9502

SERVICE= Navy

DEPS	SINGLE	MARRIED	DIV	TOTAL	MISC.	BLANK
0	24273	7408	0	31681	0	0
1	4364	6411	0	10775	0	0
2	1355	4305	0	5660	0	0
3	229	2882	0	3111	0	0
4	43	942	0	985	0	0
5	4	211	0	215	0	0
6	1	40	0	41	0	0
7	1	12	0	13	0	0
8*	0	2	0	2	0	0
TOTAL	30270	22213	0	52483	0	0

FEMALES ACTIVE DUTY BY MS AND SERVICE 9502

SERVICE= M.C.

DEPS	SINGLE	MARRIED	DIV	TOTAL	MISC.	BLANK
0	3362	1187	277	4826	0	0
1	332	1092	228	1652	0	0
2	56	519	167	742	0	0
3	6	347	39	392	0	0
4	0	129	3	132	0	0
5	0	26	2	28	0	0
6	0	9	0	9	0	0
7	0	2	0	2	0	0
8*	1	6	2	9	0	0
TOTAL	3757	3317	718	7792	0	0

FEMALE ACTIVE DUTY BY RANK 9507

RANK	ARMY	NAVY	M.C.	A.F.	TOTAL	MISC.	BLANK
E 1	4499	4655	457	2487	12098	0	0
2	5142	5136	1826	3999	15303	0	0
3	7891	9529	1683	9857	28960	0	0
4	18168	8879	1488	16222	44757	0	0
5	11091	8563	1262	10217	31133	0	0
6	6759	5536	706	5392	18393	0	0
7	4422	1950	409	3579	10360	0	0
8	718	383	96	591	1788	0	0
E 9	104	97	19	173	393	0	0
W1	173	2	24	0	199	0	0
W2	278	91	52	0	421	0	0
W3	106	30	35	0	171	0	0
W4	23	5	13	0	41	0	0
W5	0	0	1	0	1	0	0
O1	1683	943	130	1484	4240	0	0
O2	1454	1212	89	1439	4194	0	0
O3	4017	2934	152	5574	12677	0	0
O4	1992	1504	95	2449	6040	0	0
O5	917	829	44	1000	2790	0	0
O6	210	201	10	200	621	0	0
O7	3	3	0	5	11	0	0
O8	0	0	1	0	1	0	0
TOTAL	69650	52482	7792	64677	194551	0	0
MISC.	4	1	0	0	5	0	0

FEMALE ACTIVE MILITARY DUTY LOCATION 9502

SERVICE	COMUS	OCOMUS	TOTAL	MISC.	BLANK
ARMY	55041	14514	69555	99	0
NAVY	42253	8725	50978	1505	0
A.F.	6536	1247	7783	9	0
M.C.	54611	9871	64482	145	0
TOTAL	158441	34357	192798	1758	0

FEMALE ACTIVE DUTY BY EDUCATION AS OF 9502

SVC	MMSC	GED	MSC	ALT	SOM	BA	MAST	PMD	TOTAL	MISC.	BLANK
ARMY	109	876	49835	29	4961	8907	3994	102	68813	841	0
NAVY	112	708	41171	151	1325	5069	2694	59	51289	1194	0
M.C.	5	36	6516	224	232	593	143	5	7754	38	0
A.F.	2	0	13966	96	36013	8363	5536	179	64155	472	0
TOTAL	228	1620	111488	500	42531	22932	12367	345	192011	2545	0

References:

1. Raphael B. When Disaster Strikes. How Individuals and Communities Cope with Catastrophe. New York, NY: Basic Books; 1986;9:222-290.
2. Austin, L. Responding to disaster. A Guide for Mental Health Professionals. American Psychiatric Press: 1992.
3. Hodgkins PE, Stewart M. Coping with Catastrophe. A handbook of disaster management. 1991.
4. Ursano R, McCaughey BG, Fullerton, C. Individual and community responses to Trauma and Disaster: The Structure of Human Chaos. Cambridge University Press: 1994.
5. Ursano R, Norwood A. Emotional Aftermath of the Persian Gulf War: Veterans, Families, Communities, and Nations. American Psychiatric Press, Inc. In press.

APPENDIX D

**Stress and Women's Health:
Combat, Deployment, Contingency Operations and Trauma**

CONSULTATIONS

Date	Name of Presenter	Title of Presentation		
2/15	Dr. Belenky	Women in Combat		
2/22	Colonel McCarthy	Perspectives of a Woman Nurse in War		
3/2	Dr. Bray	Substance Abuse in the Military		
3/6	Dr. Martin	Sociological Perspectives of Women in Policing		
3/9	Dr. Ingraham	Women as NCO's		
3/15	Dr. Marlowe	Women in the Military and Unit Cohesion		
3/21	Dr. Vogel	Physical Fitness and Training: Strength and Gender Differences		
3/24	General Foote	Some Unique Aspects of Stress Experienced by Women in the Military		
3/28	Captain McCarthy	Nursing Experiences in Vietnam		
3/29	Dr. Johnson	Gender Issues and Training		
4/5	Colonel Leitch	Future Role of Women in UK Armed Forces		
4/6	Captain Mariner	Gender Integration in the Armed Forces		
4/11	Ms. Akers	Women and Minority Women in the Navy		
4/12	Dr. Schlenger	Trauma and Vietnam		
4/13	Dr. Wolfe	PTSD in Women		
4/17	Commander Whitehead	DACOWITS: Gender Issues		
4/18	Dr. Fiedler	Military Induced Stress Responses in Women		
4/24	Dr. Thomas	Cognitive Measurements in Thermally Stressful Environments		
4/25	CSM Rogers, et al	Women in the Military		
4/28	Dr. Depauw	An Historian's Perspective of Stress in Military Women		
5/1	General Harris	Women in the Military		
6/29	Dr. Norris	Disasters and Social Support		
7/14	Dr. Berman	The Suicidal Female		
7/19	Dr. Feuerstein	Prevention and Management of Musculoskeletal Disorders		
7/20	Dr. Steinglass	Developmental Approaches to Families in Stress		
8/4	Dr. Holloway	Women and Disasters		
9/7	Dr. Ursano, et al	Debrief		
9/20	Dr. Weisaeth	Women in Disaster		
9/20	Dr. North	Women after Disasters		
9/27	Dr. Mitchell	Eating Disorders		
9/27	CDR Holmes	Eating Disorders		